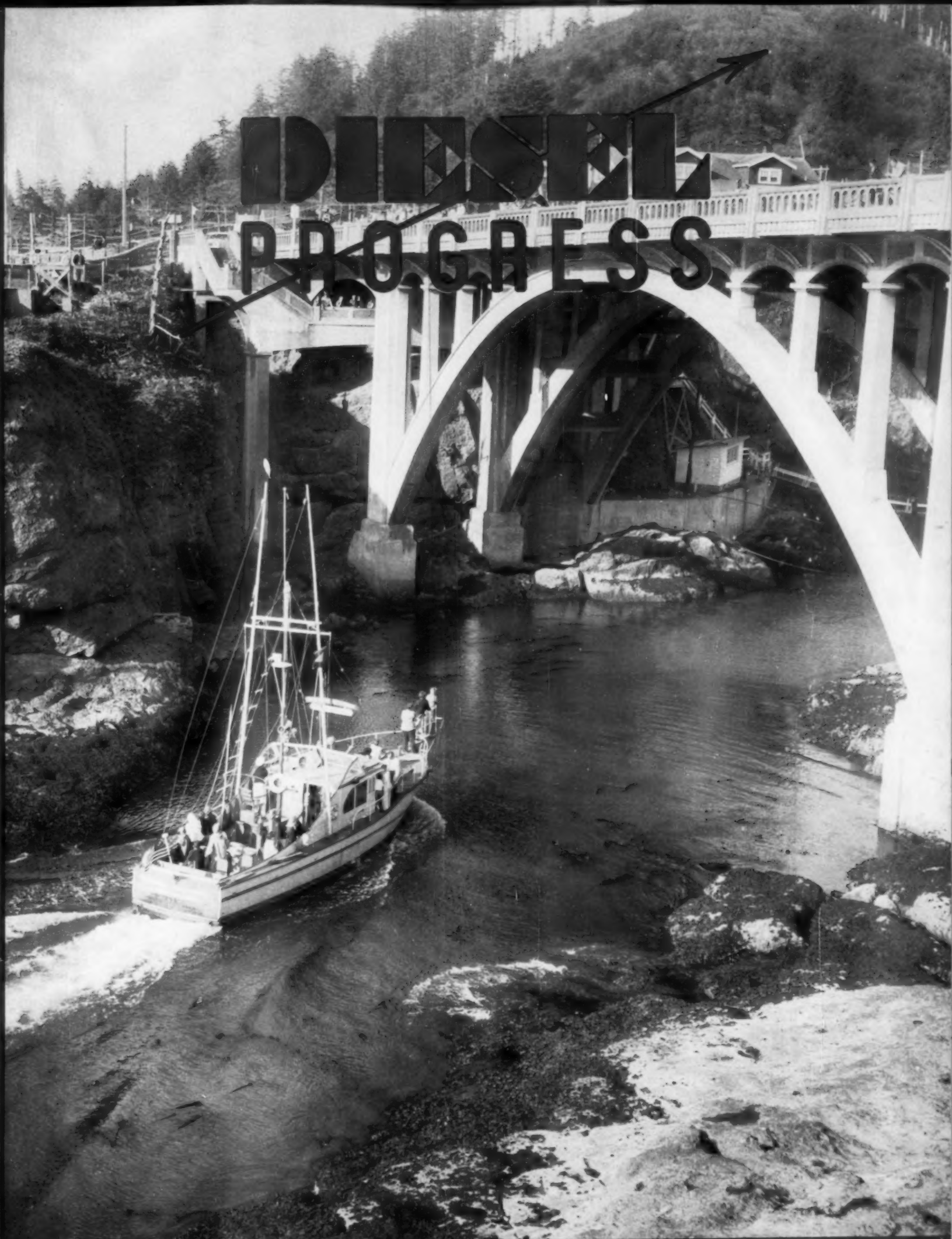


IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

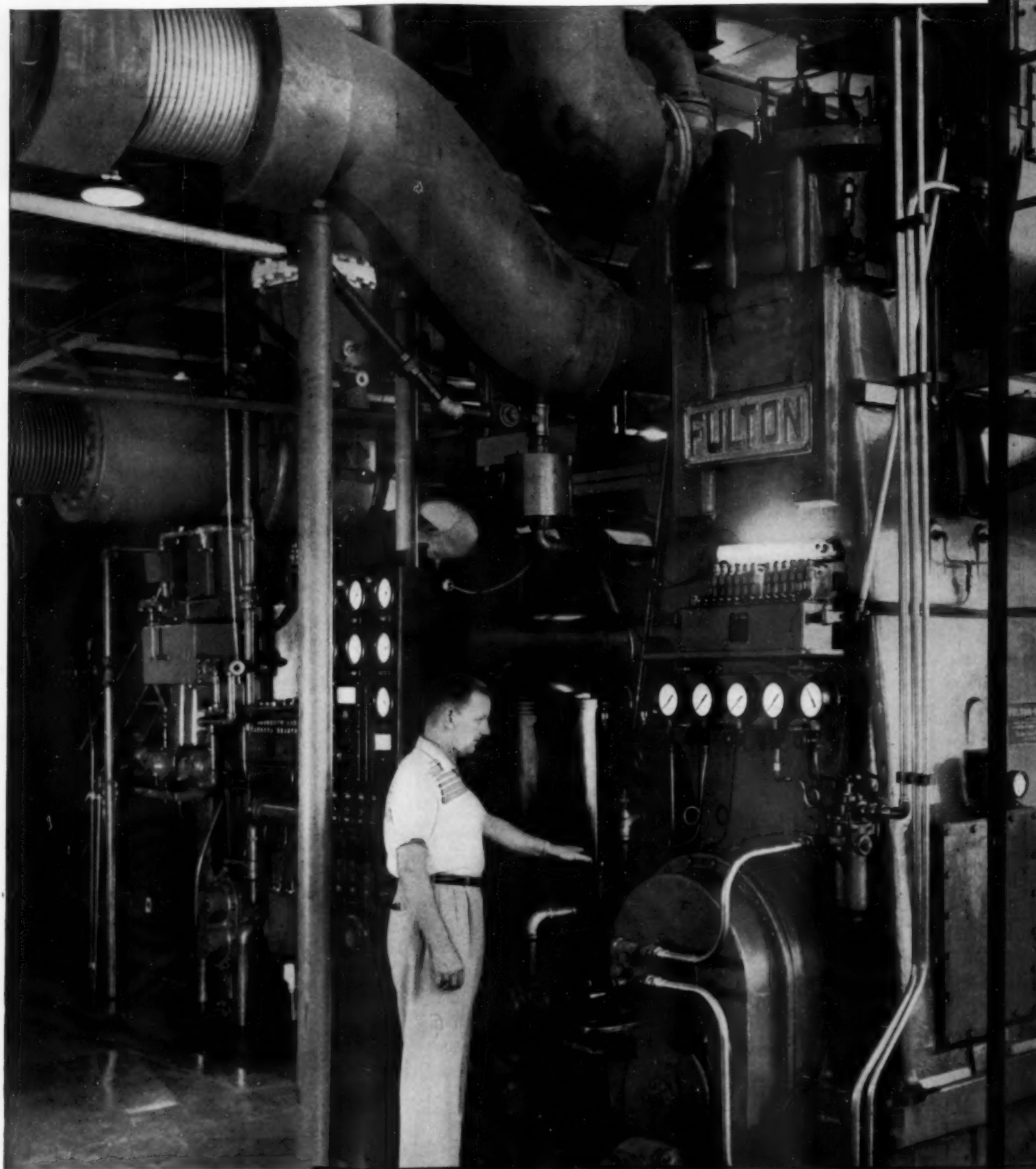
DIESEL PROGRESS



FIVE DOLLARS PER YEAR

FEBRUARY 1957

FIFTY CENTS PER COPY



TUNE IN:
METROPOLITAN
OPERA
radio broadcasts
every Saturday afternoon



TEXACO



IN 25 YEARS

**"no harmful deposits,
no stuck rings, minimum wear"**

This is a report on a mid-western utility plant (name on request) that has been lubricating its diesels with *Texaco Ursa Oil* for a quarter of a century.

Here's what the superintendent said:

"We started using *Texaco Ursa Oil* with our first diesel. It gave us such fine lubrication—clean operation, no harmful deposits, no stuck rings, minimum wear—that we naturally chose *Texaco Ursa Oil* for each of the four other engines installed since. We consider this an important factor in keeping maintenance and operating costs at an absolute minimum."

There is a complete line of the famous *Texaco Ursa Oils*. All are refined and processed especially for the lubrication of diesel, gas and dual-fuel engines—to assure *more power with less fuel over longer periods* between overhauls.

A Texaco Lubrication Engineer will gladly give you the full story. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

FOR OVER 20 YEARS, MORE STATIONARY DIESEL
H.P. IN THE U. S. HAS BEEN LUBRICATED
WITH TEXACO THAN WITH ANY OTHER BRAND

URSA OILS

FOR ALL DIESEL, GAS
AND DUAL-FUEL ENGINES

TROPIC HEAT



OR ARCTIC COLD



Harrison Heat-Exchangers Keep Temperatures Level!

Harrison goes to any extreme to keep temperatures on the beam . . . to keep temperatures normal under all types of operating conditions. These top-quality heat-exchangers are busy everywhere—on land, on sea, and in the air . . . guarding critical engine temperatures and providing safe, sure performance. They're lightweight and compact, too—designed to save you space and money. That's why Harrison is a leader in its field—that's why so many manufacturers rely on Harrison *exclusively* for dependable, economical heat-transfer equipment. If you have a cooling problem, look to Harrison for the answer.



HARRISON RADIATOR DIVISION, GENERAL MOTORS CORP., LOCKPORT, N. Y.

Watch
WIDE WIDE
WORLD
Sundays
on NBC-TV

HARRISON

TEMPERATURES
MADE
TO
ORDER

DIESEL and GAS ENGINE PROGRESS

REX W. WADMAN *Editor and Publisher*

MEMBER OF



Business Publications Audit
of Circulation, Inc.

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

BRUCE W. WADMAN *Managing Editor*
F. HAL HIGGINS *Western Field Editor*
ARNOLD B. NEWELL *Eastern Editor*
MARTHA GENDELMAN *Copy Editor*
PEGGY R. TOMACK *Production Manager*
ELAINE L. BAXTER *Circulation Dept.*

MEMBER OF



Verified Audit Circulation
Company

DIESEL PROGRESS for February, 1957, Vol. XXIII, No. 2. Published Monthly by Diesel Engines, Inc., 816 N. La Cienega Blvd., Los Angeles 46, California. Phone OLeander 5-7410. Subscription rates are \$5.00 for U.S.A. and possessions. All other countries \$7.50 per year. Subscriptions may be paid the London office at £2-12s-6d per year. Accepted as Controlled Circulation Publication at Long Prairie, Minnesota.

DIESEL PROGRESS is indexed regularly by Engineering Index, Inc.

MEMBER OF



Magazine Publishers
Association, Inc.

CONTENTS FOR FEBRUARY, 1957

Diesel Logging Review	15
Diesel Dredge Pop	19
Thief River Falls, Minn.	20
Johnson Motor Lines To The Front	22
Harbor Tug Kings Point Packs 2100 HP	24
Florida's Sewage Treatment Plants	26
Salt Lake Diesel Navy	30
National Supply Torque Converters	32
Diesels Thrive In Dust-Filled Quarry	34
Baroid Mud Delivery Barge Mr. George	36
The Waukesha Enginator	38
Pre-Cleaner For Diesels	41
Small, Versatile Diesel Compressor	42
Gas Turbine Progress	44
Automotive Diesel Progress	46
What's Going On In England	48
Eastern Diesel Observations	50

EDITORIAL AND PRODUCTION OFFICES

816 N. La Cienega Blvd.

Los Angeles 46, Calif.

BUSINESS OFFICES

ROCKVILLE CENTRE, N.Y.:
Robert K. McQuiston
184 Sunrise Highway
Rockville Centre 6-6344

LOS ANGELES 46:
816 N. La Cienega Blvd.
OLeander 5-7410

LONDON E.C. 4:
G. L. Featherstonhaugh
St. Paul's Corner
Ludgate Hill

TULSA 3:
O. F. Cozier
305 Daniel Bldg.
Diamond 3-1335

FIELD EDITORS

MIAMI, FLA.:
Edwin Dennis
250 W. 50th St.

NEW YORK AREA:
Arnold B. Newell
184 Sunrise Highway
Rockville Centre, N.Y.

LOS ANGELES 46:
James Joseph
8421 Melrose Ave.

NEW ORLEANS 12:
James L. Leslie
812 Natl. Bank of Commerce Bldg.

HOUSTON, TEXAS:
Michael T. Pate
1948 Lexington

TULSA 3:
Jack F. Cozier
305 Daniel Bldg.

JEFFERSON CITY, MO.:
L. H. Houck
400 Linden Dr.

NORTHWOOD, MIDDX, ENGLAND:
B. W. Lansdowne
"Oaklands," Nicholas Way

DETROIT 39, MICH.:
James W. Brown
15736 Kinloch Road

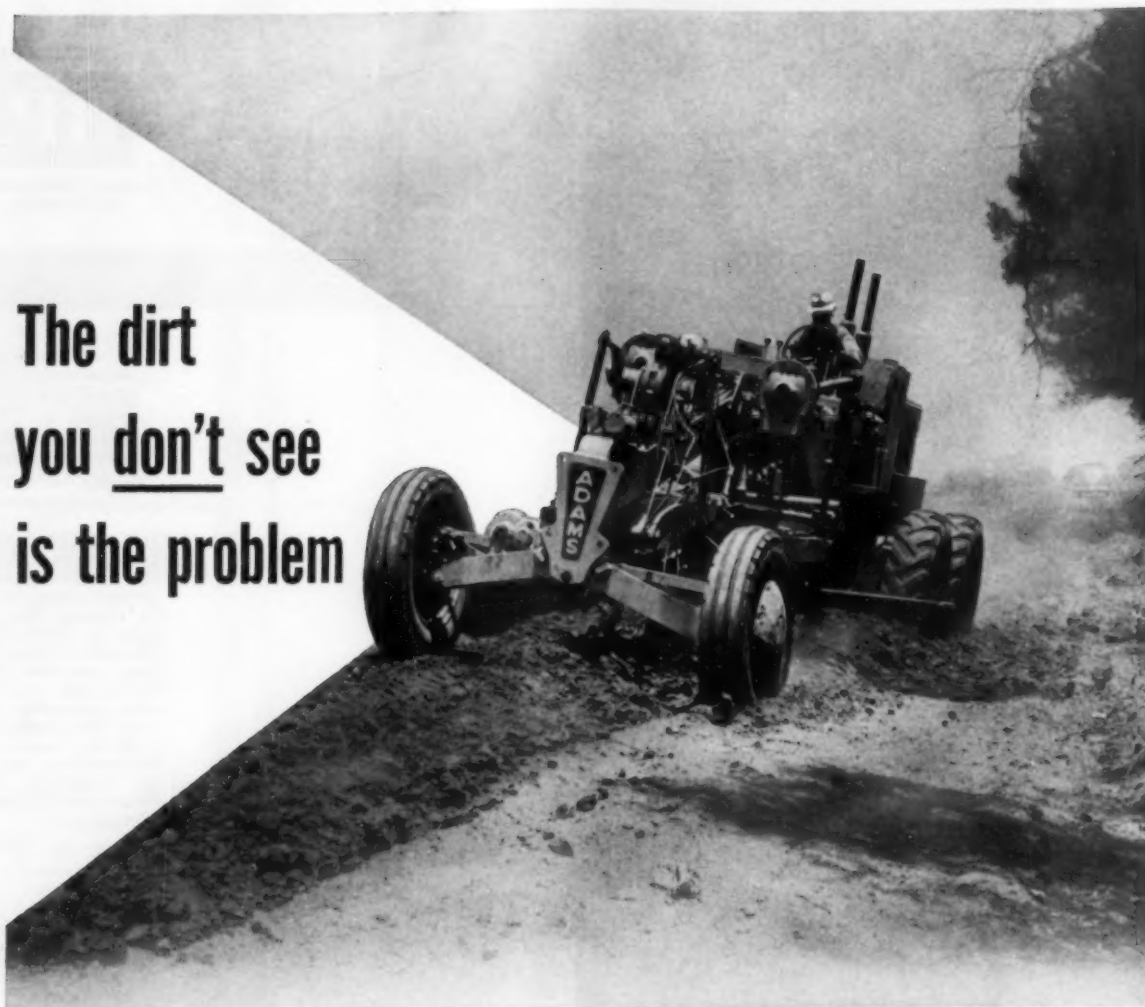
ROCKPORT, IND.:
A. D. Burroughs
R.R. #1



FRONT COVER ILLUSTRATION

Tradewinds Kingfisher, one of a fleet of tugboats owned by Tradewinds Trolling, Depoe Bay, Oregon, equipped with a pair of Allis-Chalmers Diesel DAMR 275 diesel engines.

The dirt
you don't see
is the problem



Le-Tourneau-Westinghouse Adams "660" Grader, powered by 150 H. P. Diesel Engine

Dry Type Micronic® Air Filtration solves it

The tons of dirt this grader moves in a day don't give it any trouble at all. But just let a little of the dirt that's drawn in with the air intake get through to the engine and it'll stop dead in its tracks. That's why efficient air filtration is so vital to the operation of this equipment . . . why engine and equipment manufacturers have accepted Purolator's new Dry Type Micronic® Air Filter as the most efficient yet developed.

Whether your engine is idling or revving at top speed, this new Purolator Air Filter removes 99% of all contaminants. That makes it virtually impossible for harmful abrasives to get into the precision parts of the engine no matter how dirty the job or where you're working. The Dry Type Micronic

elements save time and effort in servicing, too. Elements can be replaced in one-tenth the time — and with one-tenth the effort — needed to service other types.

Purolator Catalog AFC-56 contains a valuable chapter "Facts about engine air requirements" that can help you prolong engine life and reduce repair bills. Send for your free copy today. Address Dept. DP9-210.

FILTRATION FOR EVERY KNOWN FLUID

PUROLATOR

PRODUCTS, INC.
RAHWAY, NEW JERSEY



Torque Converter helps 36-year old crane to another lifetime of service!

A 36-year old locomotive crane — owned by the Northern Pacific Railway, and practically worn out from years of extended use — was recently saved from the scrap heap by a Twin Disc Torque Converter-Caterpillar Diesel Engine power package.

Originally powered by steam — when it was put into service in 1920 — this Browning 21-ton Locomotive Crane is used by the Northern Pacific Railway in its Como Shops at St. Paul, Minn., for general railroad work. This includes all types of loading and unloading with a sling and electro magnet, and hoisting work.

In addition to *cutting fuel costs* 50%, the torque converter-diesel engine combination has completely rejuvenated this venerable old crane, so

that it should be good for another lifetime of service.

According to E. L. Jensen, General Storekeeper, "The Twin Disc Torque Converter is the crux to the success of repowering this old crane. Without the converter, the crane would not have been worth rejuvenating.

"With elimination of the old steam boiler, the ponderous reduction gears and the awkward shift levers — *plus* 50% savings in fuel costs, this conversion has been a decided success."

The torque converter provides torque multiplication to the exact ratio required, and permits delicate "inching" or "holding" of loads under power.

Overloads, shock loads and vibrations are cushioned out through fluid

connection — protecting *both* driving and driven equipment. The results are *reduced* fuel and maintenance costs, *extended* cable life, *increased* profits.

Twin Disc manufactures *both* three-stage and single-stage torque converters as well as fluid couplings, and therefore can offer you *unbiased recommendations* as to the type fluid drives best suited for your next new cranes, or when you repower.



Twin Disc Clutch Company, Hydraulic Division, Rockford, Illinois



1
**Strategically located
FACTORIES**

Stocking True Original Parts for continued TOP performance of your Allis-Chalmers engines.

**YOU are
backed up**

**3
deep**

with parts



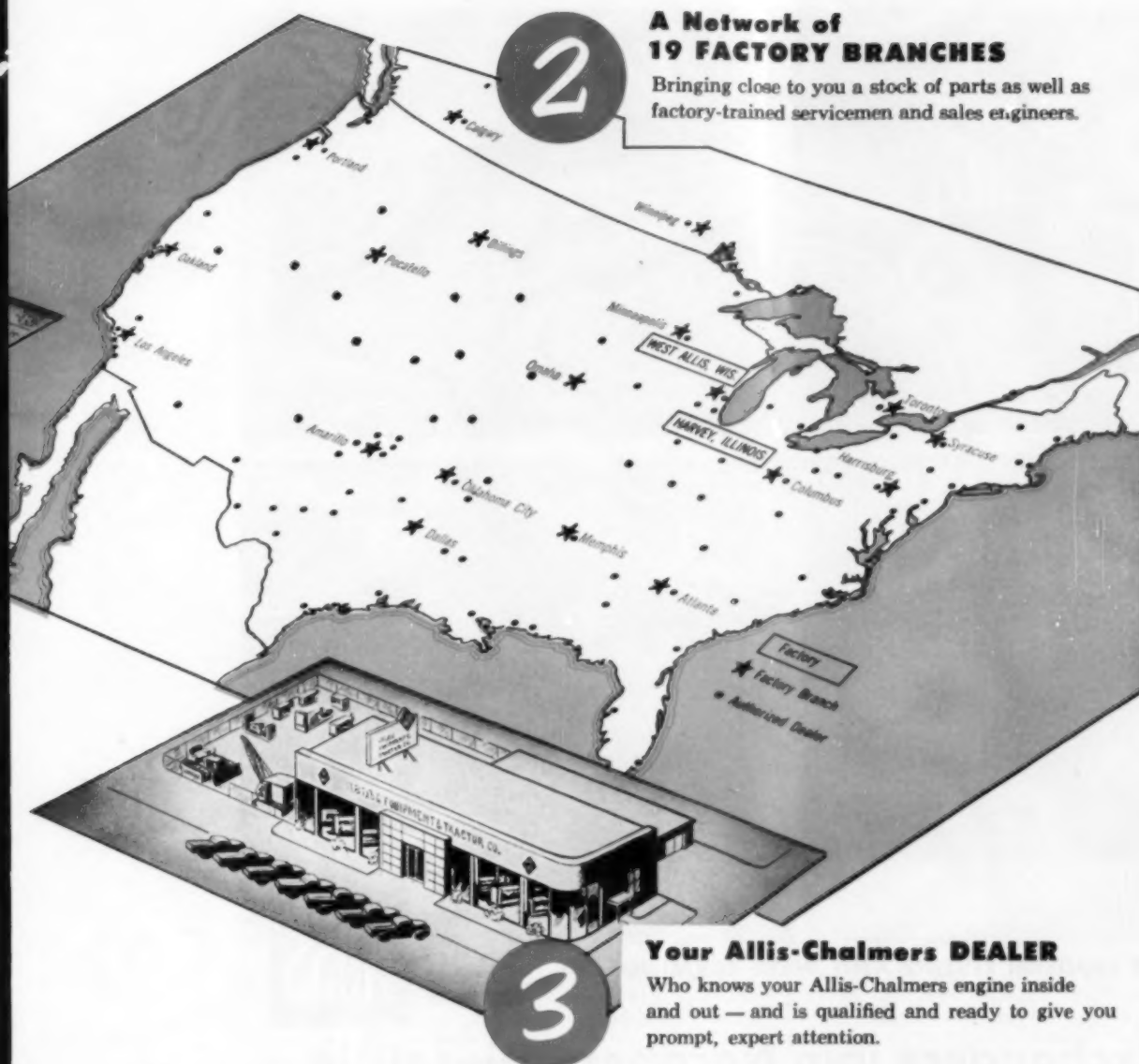
**and service...when you use
ALLIS-CHALMERS engines!**

BE-5

2

A Network of 19 FACTORY BRANCHES

Bringing close to you a stock of parts as well as factory-trained servicemen and sales engineers.



3

Your Allis-Chalmers DEALER

Who knows your Allis-Chalmers engine inside and out — and is qualified and ready to give you prompt, expert attention.

You enjoy "factory-town" service wherever you are when you operate Allis-Chalmers engines — for you are backed up 3 deep by Allis-Chalmers' proven dealer-branch-factory system.

What does this mean? It means that your dealer is serviced from one of 19 nearby factory branches—or direct from the factory. Each branch carries a

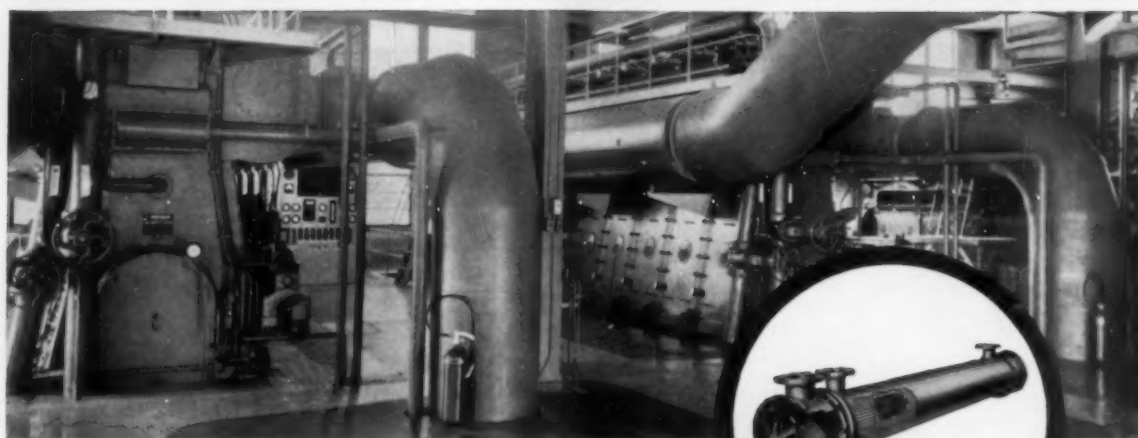
stock of True Original Parts and is staffed with factory-trained servicemen as well as sales engineers. This assures prompt attention whether you need a replacement part or technical assistance.

Ask your Allis-Chalmers engine dealer to show you how this 3-deep service can help on your specific engine needs. Write for literature and details.

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS





POWER FOR MODERN LIVING AND WATT FARMING

Ross Exchangers join Nordberg Diesels in around-the-clock service for rural Illinois

Progressive farmers in West Central Illinois are putting electricity to work on a large scale, both at home and on the farm. Not only do their houses abound with modern appliances, but they have found that it pays to dry corn and even air-condition pig houses with electricity.

To meet the great demand for moderately priced electrical power, the Illinois Rural Electric Company recently expanded the generating plant pictured above at Pittsfield. Two Nordberg 3870 hp Dualfuel engines, each driving a 3000 KW generator, were installed.

On this tough, demanding job where dependable lubrication is a "must," Ross Exchangers have been selected to control lube oil temperatures. Power generation is kept at a peak and down time avoided, because moving parts receive their full share of properly cooled lube oil at all times.

Where ruggedness and high thermal efficiency are top requirements, you'll find Ross Exchangers regularly at work, cooling oil, water, air and gas on all types of prime equipment. Of durable construction, they're completely pre-engineered, fully standardized, and available in a wide range of sizes.

Learn how Ross Exchangers can meet your heat transfer requirements by requesting Bulletin 2.1K5 and consult with a Ross sales engineer. Ross Heat Exchanger Division of American-Standard, Buffalo 5, N.Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.

ROSS HEAT EXCHANGER

Division of **AMERICAN - STANDARD**



The Engineer's Field Report

CASE HISTORY
RPM Delo Oils
LUBRICANT
McGrew Brothers
FIRM *Medford, Oregon*

Logging trucks work 4 years in mud, dust, and snow without a single bearing failure



FROM LOGGING SHOW TO MILL is a rough 40 miles for McGrew Brothers fleet of B-61 Mack trucks. Four units like one above haul 20-ton payloads through mud, deep dust, or snow, 12 hours a day, five days a week. Mr. E. E. McGrew, partner in the firm, says, "Our trucks take a real beating. But RPM DELO Special Lubricating Oil helps us hold maintenance and replacement costs to a minimum. In the four years we have used this oil, we have never lost a bearing."

"RPM DELO" Special is also used in all other equipment—four pickup trucks, two crew wagons, two water wagons, two loaders, and four Caterpillar-built tractors; three D-8's and a D-7. One of the D-8's went 5,000 hours before

overhaul and, after inspection, four of original pistons were put back in service. Mr. McGrew designed unique push-arm rig (above), used to unload trucks and stack logs on cold deck.



TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

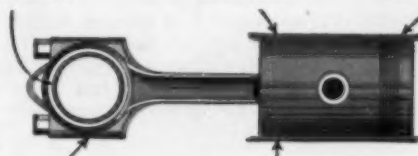
FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies listed below.

Why RPM DELO Oils prolong engine life

Special compounds stop corrosion

Anti-oxidant resists lacquer formation

Detergent keeps parts clean



Inhibitor resists foaming

Metal-adhesion qualities keep oil on parts in running or idle engine

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

Report on Research and Development at Erie Forge & Steel Corporation



Shaft is rotating during non-destructive sonic test

No Defects In This 75,000 Pound Forging

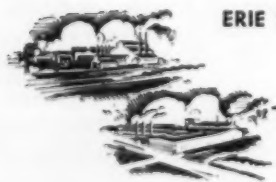
Today's demands by the electrical industry for large rotor forgings free of unsound metal are met at Erie Forge & Steel Corporation by a continuing research, testing and development program.

For example, this 75,000 pound rotor forging is being tested by the Ultrasonic Reflectoscope, a test so sensitive that it will expose structural defects of microscopic size. Even under so rigorous a test, this huge forging showed *no defects*.

Through the years our continuously expanding program of Research and Development, keeping abreast of progress in the metal industry, has resulted in the use of the most modern techniques in the Open Hearth, Forging, Heat Treating and Quality Control Divisions. Under direction of our Metallurgical Department we are producing:

- Cleaner, sound ingots
- Control of phosphorus and sulphur
- Maximum elimination of hydrogen in steel making
- Ingot mould design and solidification characteristics
- New compositions with greater ductility, notch toughness
- Accurate temperature control in melting, forging, treating
- New forging techniques to insure metal soundness
- Improved concepts in testing and evaluating quality

Another example of the advantages of one responsibility and one control.



ERIE FORGE & STEEL CORPORATION • ERIE, PENNSYLVANIA

MEMBER AMERICAN IRON AND STEEL INSTITUTE





ON SHORTLINE AS WELL AS MAINLINE ROADS IT'S BENDIX FUEL INJECTION

All over the country shortline railroads like those listed here are giving 'round-the-clock service that helps make the American railroad system the envy of the world.

Using 70-ton and 95-ton General Electric road switchers powered by Cooper-Bessemer engines with Bendix* Fuel Injection Equipment, these shortline roads maintain high operating standards in the performance of their important work.

Bendix is proud that its fuel injection equipment has received such high endorsement from so many shortline railroad operators.

It furnishes further evidence that when dependable, efficient, and economical operation is a must Bendix is the logical choice for fuel injection equipment. SCINTILLA DIVISION OF BENDIX AVIATION CORP., SIDNEY, N.Y. EXPORT SALES AND SERVICE: BENDIX INTERNATIONAL DIVISION, 205 EAST 42ND ST., NEW YORK, N.Y. *REG. U.S. PAT. OFF.



This Bendix pump and nozzle are used on the type of road switcher pictured above.

Partial list of shortline roads using Bendix Fuel Injection Equipment

ALBANY & NORTHERN
ARKANSAS & OZARKS
BALTIMORE & ANNAPOLIS
BARRE & CHELSEA
BELFAST & MOOSEHEAD LAKE
COLORADO & WYOMING
DES MOINES & CENTRAL IOWA
EAST ERIE COMMERCIAL
FT. DODGE, DES MOINES & SOUTHERN
FRANKFORT & CINCINNATI
GEORGIA NORTHERN
GREENVILLE & NORTHERN
HAMPTON & BRANCHVILLE
LANCASTER & CHESTER
LIVE OAK, PERRY & GULF
MISSISSIPPI EXPORT
MOBILE & GULF
MUNCIE & WESTERN
NORTHAMPTON & BATH
RAHWAY VALLEY
SANFORD & EASTERN
SOUTH GEORGIA
TALLULAH FALLS
VALDOSTA SOUTHERN
WASHINGTON & OLD DOMINION

Scintilla Division



How Aitkin Light Plant came to choose STANODIESEL Oil M

Case story of exceptional results obtained with Standard Oil diesel lubricants

Because of plant operating conditions and generator capacity installed, Aitkin, Minnesota, Municipal Light and Power Plant had to operate a 1,235 H.P. Worthington engine over 38,000 hours before it could be taken out of service for complete overhaul. During that time, 19.2 million K.W.H. were generated. STANDARD HD Oil, predecessor to STANODIESEL Oil M was the lubricant.

When the engine was overhauled, all pistons were in good condition. All rings were free to move in ring grooves. There were no scars on cylinder liners. Piston walls were bright, wear was even. Based on this performance from STANDARD HD, plant management converted to the improved new oil—STANODIESEL Oil M—at the time of overhaul. STANODIESEL Oil M has been giving top performance ever since.

STANODIESEL Oil M is made from highest quality base stock. Additives help the oil resist viscosity change and keep parts clean. Other additives control foam, keep highly stressed parts lubricated.

Get more information about STANODIESEL Oil M from your Standard Oil industrial lubrication specialist. There is one near you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY
(Indiana)



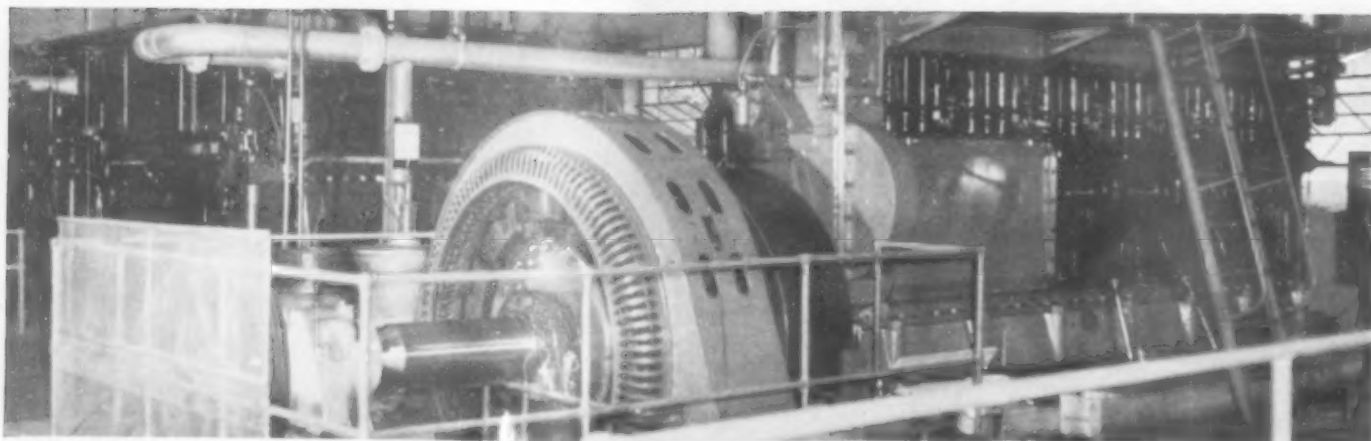
John Acklestad, Aitkin plant superintendent, and Carl Kienner (left) Standard Oil industrial lubrication specialist check engine service record. Carl has been rendering technical service on lubrication problems at Standard Oil for eight years. He has a degree from the Michigan College of Mining and Technology and has completed the Standard Oil Sales Engineering School.

"As is" photo of piston removed from engine after 38,000 hours of service. Rings were free.



Quick facts about STANODIESEL Oil M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by use of economy fuels.
- Maintains film on difficult to lubricate areas and parts.
- Eliminates spark plug fouling in spark ignited gas engines and reduces combustion chamber ash and deposits in engines burning natural gas, LPG and liquid fuels.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil commingle.



CH-1629



*advanced design in
turbochargers
means...
air-cooling!*

**AiResearch
turbochargers
possess this
all-important
characteristic**

There's little quarrel in the diesel industry about the air-cooling principle being highly-desirable in a turbocharger. It eliminates the need for extra plumbing on installation, puts no additional burden on an engine's cooling system and makes for a lighter, smaller unit in relation to output.

AiResearch turbochargers now available have been designed on this principle — which promises to be universal in the future. In addition,

our units increase power up to 100% depending on design and application of your engine, cut fuel costs, reduce noise and decrease or eliminate smoking. The removable rotating assembly

makes them easier to maintain than other turbochargers.

We invite your inquiry on how you can improve the performance of your diesels by the application of our turbochargers.

BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS

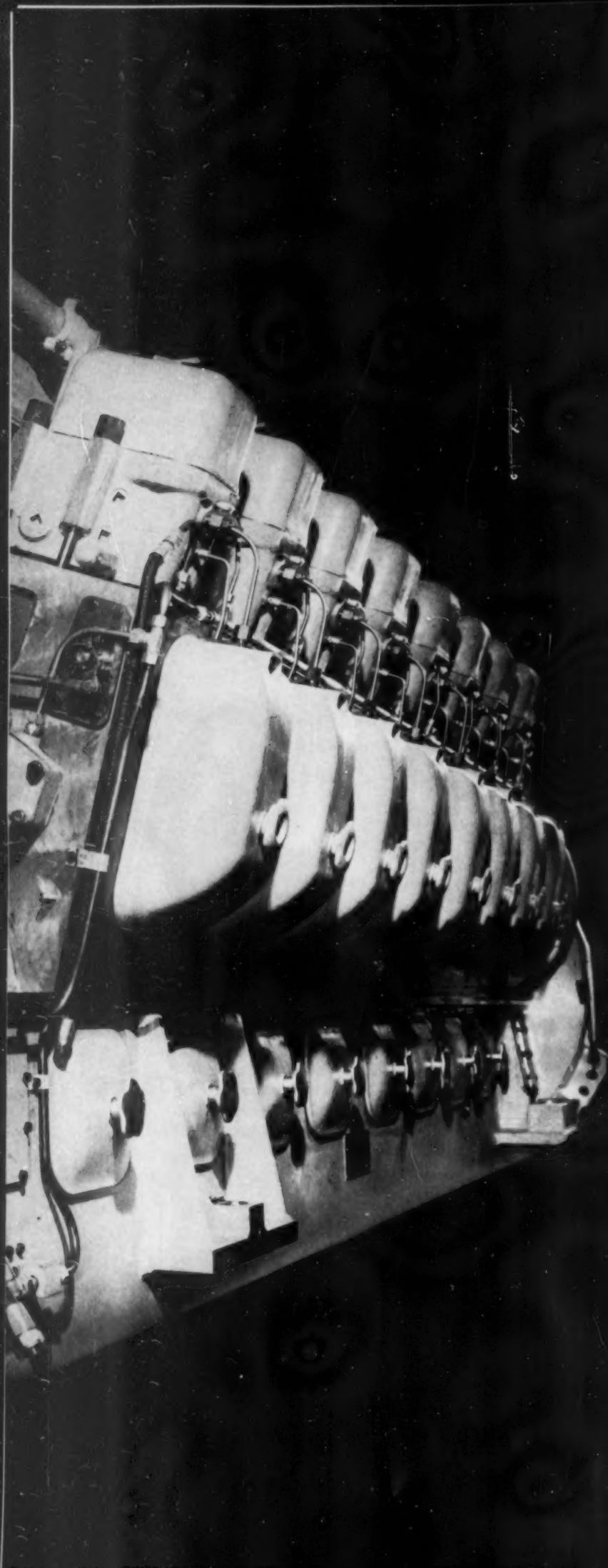
MODEL	T-10	T-14	T-15	T-30-2	T-30-6
Diameter — in. nom.	9	11.5	15.25	15.25	16
Length — in.	9	14.12	16.75	17.25	21.75
Weight — lb.	40	95	125	135	195
Output — lb/min. (Standard Conditions)	25-40	35-65	35-65	70-95	115-175



AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS



ALCO TRIMS WEIGHT BOOSTS POWER CUTS COSTS IN MODERN MODEL 251 DIESELS

The ALCO 251 diesel is made for today's requirements of stationary service. Its base and block are rugged weldments for lower weight, higher strength than old-time castings. Four-point mounting eliminates grouting and heavy foundation costs. Use of modern proven materials in the power section extends the life of the 251 diesel, too, and maintenance is easier and less costly.

More power per pound is provided by improved fuel injection, modern turbosupercharging plus an air after-cooler. The basic 251 diesel can be easily adapted to any stationary service by simply adding standard parts, including dual fuel, and it is especially suitable for automatic or remote operation.

ALCO's regional warehouses—seven located throughout the country—give speedy service on parts orders. This, plus the fact that all models of the 251 diesel have interchangeable parts, means that your parts inventories can be kept low.

If you would like more information on the advantages of the ALCO 251 diesel, contact your nearest ALCO sales office, or, if you wish, write for Bulletin DE-6 to Transportation Products Division, Dept. TR-3, P. O. Box 1065, Schenectady 1, N. Y.

Condensed Specifications for ALCO 251 Diesels

No. Cyl.	Bore and Stroke (in.)	RPM Range	BHP Range	Approx. Wt Dry (lb)
6	9 x 10½	350-1000	550-900	22,100
12	9 x 10½	350-1000	1100-1800	32,650
16	9 x 10½	350-1000	1470-2400	42,000

ALCO

ALCO PRODUCTS, INC.

NEW YORK

Sales Offices in Principal Cities

*Locomotives • Diesel Engines • Nuclear Reactors
Heat Exchangers • Springs • Steel Pipe • Forgings
Weldments • Oil-Field Equipment*

DIESEL LOGGING REVIEW

Part I

Pacific Logging Congress

By F. HAL HIGGINS

THE diesel has won its place in powering the logging industry and didn't have to give any demonstrations at the 47th annual Pacific Logging Congress to prove its universal application in powering logging equipment. This year the Congress was in San Francisco, which is the focal point of the men who manage the industry of harvesting trees and manufacturing them into the many wood products required by our modern population. Yet scarcely twenty years ago the first diesel tractors went into the woods and soon had the logging congress holding its annual meetings around demonstrations of the diesel engine as hitched to but one make of tractor and a few stationary items like yarders, power shovels and camp lighting systems.

"This logging congress is here for business," was the way one visiting official from Standard Oil of

Clark Michigan crane and truck combination loading logs on a diesel truck in the Northwest. It is powered by two Waukesha diesels - a 135 DKB in the crane and a 140 DKB in the truck.

Washington TL-11 Trakloader is powered with a GM Detroit 4081 diesel driving through an Allison torque converter and Western Gear two speed Torq-master transmission.

California summed up his contacts with the Congress after attending for two days. The management committee was made up of a trio of officers from lumber companies in Washington, Oregon and California, another three past presidents, two officers from pine and another pair from fir, one from redwood, plus one British Columbia official. Being all from the management side of their companies, they know what their common problems are, and the program and resolutions were on the targets set up by general agreement. Top problem of the western logger today is a double-barreled highway need in access roads to their billions of feet of standing timber and bigger and safer trucks to haul their logs out of the woods to the mills and on to markets.

Gordon A. MacGregor, president of MacGregor Triangle Company, Boise, Idaho, put the case for the logger in telling the congress to ask for a raising of the allowable pavement loads from 32,000 to 40,000 lbs tandem axle loading. In Idaho, Mac-



Gregor declared, half of the \$3,000,000 annual road maintenance could be saved if roads were built to higher standards. The logging industry has always been willing to pay the extra cost of building key arterial roads to link forest areas of perpetual yield capacity to major manufacturing centers if built to standards that will permit safe and economical transportation of logs. Such roads will last longer, require much less upkeep, and better serve both travelling public and industrial users of the highway. The economy of bigger loads on heavy diesel trucks was further proved by the report of Harold P. Miller of Crown Zellerbach Corp., Portland, Oregon, in citing the recent 2-year WASHO road tests conducted by Idaho state highway officials. On modern public highways, tandem axle hauling equipment can transport three-quarters more pay load than single axle equipment with the same equivalent effect on pavement, as far as stress is concerned.

Summing up the case for the bigger trucks with multiple axle equipment, Emmet R. Aston, Biles-Coleman Lumber Co., Omak, Washington, in an interview with this DIESEL PROGRESS representative, said it gets down to a matter of eliminating the little light gas trucks that are overloaded with resulting brake failures on mountain roads to cause the unfavorable publicity against logging trucks by tourists who complain of long and dangerous crawls behind such trucks that they cannot pass without risk of car and lives. "Make them all equip with air brakes," he said, "and that gets rid

of your little old wornout Fords, Chevies, Dodges, etc., that cause the wrecks and slow the traffic on the roads of today." The big diesel trucks with maybe \$5,000 in air brakes are owned and operated by men and companies capable of handling them safely with the big investments at stake. Also, they can speed up traffic to a pace about legal with the auto traffic instead of causing traffic congestion and indignation of the travelling public against the logging industry.

High points of the 3-day program from the diesel industry's viewpoint were heard in the Pacific Logging Congress' Automotive Equipment Study Committee by temporary chairman Robert Olin of Potlatch Forests, Inc., Lewiston, Idaho. Olin outlined plans for cooperative action between the National Society of Automotive Engineers and the Pacific Logging Congress to improve design, operation and maintenance of logging equipment. Typical problems to be solved are plugged radiators, fan disconnects on trucks in cold weather, better air cleaning equipment, more study of tire designs and construction to meet logging conditions, more information on proper lubricants for engines and a study of gas turbine truck power. Exhaust braking on trucks as worked in British Columbia was reported on by A. N. MacKenzie of Forest Products Ltd., Vancouver, B. C. The idea originated in Europe and was introduced by MacKenzie two years ago on one truck. Several more were installed as a result of safer operation on steep hills, doubled brake lining life and no damaging effect on engines.

The torque converter report is so important to diesels that it will be dwelt on at length later in this article. Paul Bunyan's Wood Basket is a Hammond idea described by Gray Evans of that company as a huge steel basket mounted on one of their diesel trucks for gathering up odds and ends of timber in the woods and saving a lot of wood that would otherwise be lost in logging an area. The mobile spar tree is another British Columbia idea with diesel drive that W. Wallace Baikie of Baikie Bros. Logging Company described to the Congress. It is mounted on a rubber tired truck. It cuts cost and time in logging Douglas fir in rough country. A Swiss idea called the Wyssen Skyline was reported by E. E. Matson, forest service expert from Portland. Powered by a Swiss diesel engine it is an answer to logging mountainous terrain formerly considered unreachable for practical logging. A new 5-ton machine, larger and heavier than the original Swiss unit brought over, is now being tested at Twisp, Washington, after two years of trials of the original importation.

The Congress ended with passage of seven resolutions. Resolution VI touches development of better highways for use of the heavier diesel trucks for access to more timber and to provide safer truck operation. Officers elected were: L. T. Murray, Jr., president; Nils Hult, vice-president; Robert Dwyer, treasurer. All three are from leading companies active in the industry—West Fork Timber Co., Tacoma; Hult Lumber Co., Junction City, Oregon; and Dwyer Lumber Co., Portland.

Euclid's TC12 testing its muscles in bulldozing out old dead trees for a logging road in Idaho. It has two complete independent power trains, point out the Euclid men at the Pacific Logging Congress. Engines are GM 6-71s with Allison torque converter on each. Each power train drives one track.

R. G. LeTourneau's Off-Road Transporter, powered by Cummins NRTO-6 engine is definitely headed into logging as well as all other rugged freighting jobs, declared the LeTourneau crew at the Pacific Logging Congress. The U. S. Army has been working with LeTourneau on several such heavy items for use in its toughest transport jobs.



DIESEL LOGGING REVIEW

Part II - Torque Converters Serve In The Woods.

THE torque converter has won its place in logging trucks in the five years since it got one of its first trials by the Hammond Lumber Co. near Eureka, Calif., in the big redwoods. Not only is the subject so important that it was given a panel airing by seven experts during the 47th annual Pacific Logging Congress, but every manufacturer present reported in personal interviews with this DIESEL PROGRESS representative that they were equipping tractors, trucks, loaders and other logging equipment with this important item. Officials on the program also gave credit to the torque converter for solving some of their tough mechanized logging problems in mountainous terrain operations.

President-elect L. T. Murray, Jr., West Fork Timber Co., Tacoma, gave DIESEL PROGRESS this summary of his company's use of diesels and the torque converter: "All our company's tractors, shovel and trucks are equipped with Twin-Disc torque converters. We have five diesel trucks, four with Cummins and one with GM diesels. These are three Kenworth, 1 Autocar, and an International. Our tractors are 1 HD20, 1 HD10, 1 HD15, all Allis-Chalmers with GM diesels. Also, we have

2 HD16s with Allis-Chalmers diesels. The Northwest shovel is an 80D with a Murphy diesel. The torque converter added to the diesel engines in our equipment has given us low costs. We have found great fuel economy in our long haul diesel logging—about 35% saving."

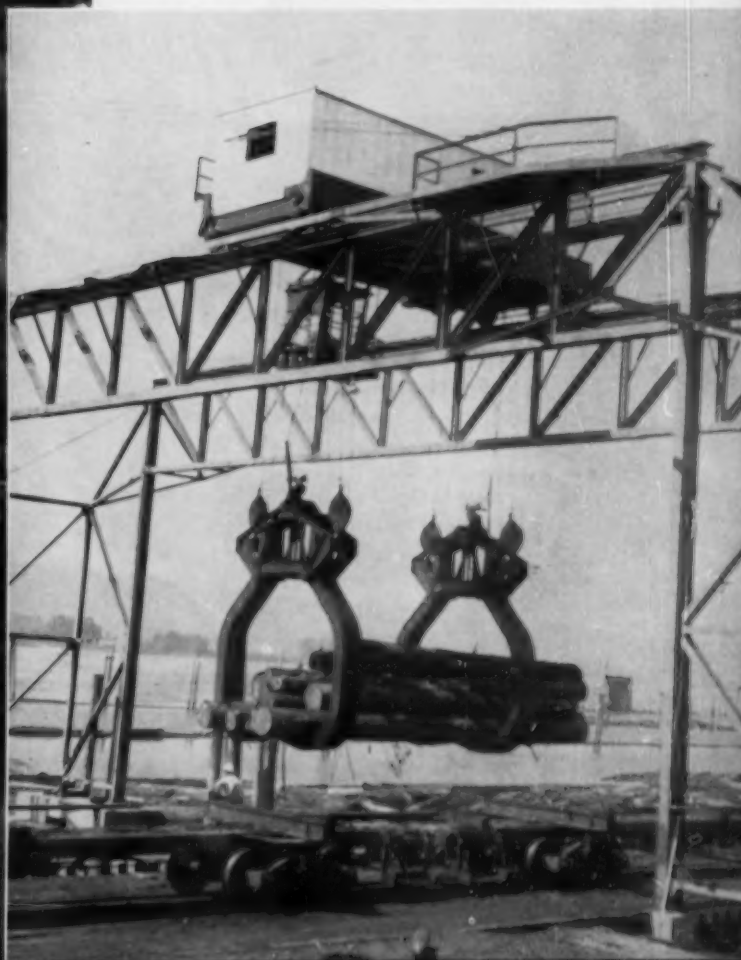
On the panel devoted to the subject were these men of top standing in logging and heavy equipment; Gray Evans, Hammond Lumber Co., Samoa, Calif.; Bob Neils, J. Neils Lumber Co., Libby, Mont.; R. C. Norrie, Seattle; Ed Ross, Oakland, Calif.; W. C. Edwards, Berkeley, Calif.; Pierce Tyrell, Rockford, Ill.; A. N. MacKenzie, Vancouver, Canada. Mr. Evans gave an interesting account of his 5-year experiences and we quote some excerpts as follows: "Like any other machine or tool or method of application in logging use, there isn't any pat, sure panacea for success and torque converters in logging trucks aren't any exception, but they definitely have an important place. We at Hammond Lumber Company, I believe, have the distinction of making the first logging truck torque converter application having made our first conversion early in 1951. Since then we have pur-

chased four trucks equipped with Twin Disc torque converters. All five of our units have performed very well and we are quite pleased with their performance on the type of logging truck haul on which we are using them. The torque converter log trucks show up the best on severe adverse grades, particularly a grade with many fluctuations in percent of grade and it is in this type of show we try to keep our units."

"The two most important advantages of torque converters for logging use are driver ease and better engine life. What I am calling driver ease includes less shifting making the driver's job easier and also this insures the management of less gear train damage as even the most experienced driver will make a few mistakes in shifting which in turn reflects in damage to the gear train. The second feature of better engine life was only a theory as far as we were concerned prior to our actual use of torque converters. Now we have actual records of proof that this is a fact. We are obtaining a full one third more life between engine overhauls on our 300 hp engines in the torque converter trucks than with the same engines in a direct drive truck."

Berger diesel crane at Weyerhaeuser, Longview, Wash. is powered with a Cummins NHBIS 275 hp supercharged diesel driving through Twin Disc clutch and Twin Disc torque converter. Designed and installed by Berger Engineering Co. of Seattle, log grapples open up to 16 feet. Capacity is 250 carloads per day.

17





This model TL-6 Trakloader, smallest of the mobile loader-yarders manufactured by Washington Iron Works, is owned and operated by Russell Oliver of Sand Point, Idaho. It is working on the Pack River in northern Idaho. This machine is equipped with a GM Detroit 6-71 diesel engine and Twin Disc torque converter.

DIESEL LOGGING REVIEW

Part III - New Diesel Driven Logging Equipment.

THE logging industry has long ago reached the point of acceptance of diesel engines for power to replace the obsolete steam and gas tractors, trucks, railroads, cranes, loaders, etc. It is no longer necessary to hold an equipment show and demonstration as part of the annual Logging Congress; every manufacturer present and others not represented with entertainment and contact staffs had new models and improved machines ready for the logger in 1957. A few noted in interviews with manufacturers at the 47th annual Pacific Logging Congress are: Paul Bunyan's Wood Basket is a huge steel rack mounted on a diesel logging truck. It was described by Gray Evans of Hammond Lumber Co., Trinidad, Calif. It makes the picking up of odds and ends of logs scattered over an area easy and at a low enough cost to make it a real saving, he reported. Frame is hinged to allow tipping basket to spill out load at dump.

A mobile spar tree that can be moved easily and quickly to yard scattered timber was described by

W. Wallace Baikie of Baikie Bros. Logging Co. of Campbell River, British Columbia. It is mounted on a rubber tired truck. The Swiss diesel Wyssen skyline is being Americanized in development on an experimental forest service sale near Twisp, Washington. The new machine is a 5-ton job, heavier and larger, with correcting un-hooking device to make the Swiss idea practical on steep terrain heretofore considered unworkable. It should be ready for manufacture in another year or so.

Farmers producing more than half of the 8-foot pulpwood in the Lake states have developed light and inexpensive machinery for their logging, reported H. M. Shepard of American Pulpwood Association. This gives farm tractors of both wheel and crawler types a place for year round work at farming and logging for this area. As all tractor builders are now manufacturing diesel tractors, the trend is strongly to diesels. The Terratrak crawler tractor built by American Tractor Corp., recently acquired by J. I. Case Co., has a loader for

this kind of light logging. They equip their Terratrak diesels with the Bates Clam loader.

All the crane and shovel and other manufacturers are developing log loaders and building them bigger and more maneuverable for the demands of the logger. P. & H., Skagit Steel & Iron Works, Washington Iron Works, Bucyrus Erie, Link-Belt, Northwest, Berger, Thew Lorain, Insley, Baldwin-Lima Hamilton, LeTourneau, are all coming up with loaders of one type or another. All have diesels by a variety of manufacturers like Cummins, GM, Allis-Chalmers, Waukesha, Cat, IH, etc.

The western logger is on the move to keep ahead of labor costs, handicaps of terrain and inefficient and insufficient roads, and the competition of lumber substitutes. One logging company official on the program not yet past middle age, tossed the writer this spur to the recent logging revolution: "When I started in 1912, skilled logging labor got \$1.20 a day. Now we pay \$2.50 to \$3.00 an hour."

DIESEL DREDGE *POP*

By ED DENNIS

THE ever growing population of Florida, and their insatiable desire for breeze swept waterfront homes, is creating quite a problem on the Gold Coast and along the Florida Keys.

Topographically, Florida is a low lying peninsula, the south east coast or what is commonly known as the Gold Coast, is a flat limestone shelf covered with a variable thickness of sand to a depth of a few feet. In numerous areas this sand ridge has been breached by tidal flats and mangrove swampland.

There is always a constant demand for dredges, especially small dieselized dredges which can pump solids quickly and convert mangrove swampland into hard firm ground reasonably.

To meet this increasing demand, the Pierce-Chesholm Corp. located in Marathon on the Fla. Keys, had George Pelton, Naval Architect, design a 55 ft hydraulic dredge which could pump coral rock along with sand found in Florida coastal waters.

The new dredge *POP* named after Christian "Pop" Cox, one of the country's well known dredging authorities, was assembled at the docks of Auto Marine Engineers Inc. in Miami. The dredge is of scow type construction measuring 55 ft long, 22 ft wide and draws 5 ft of water.

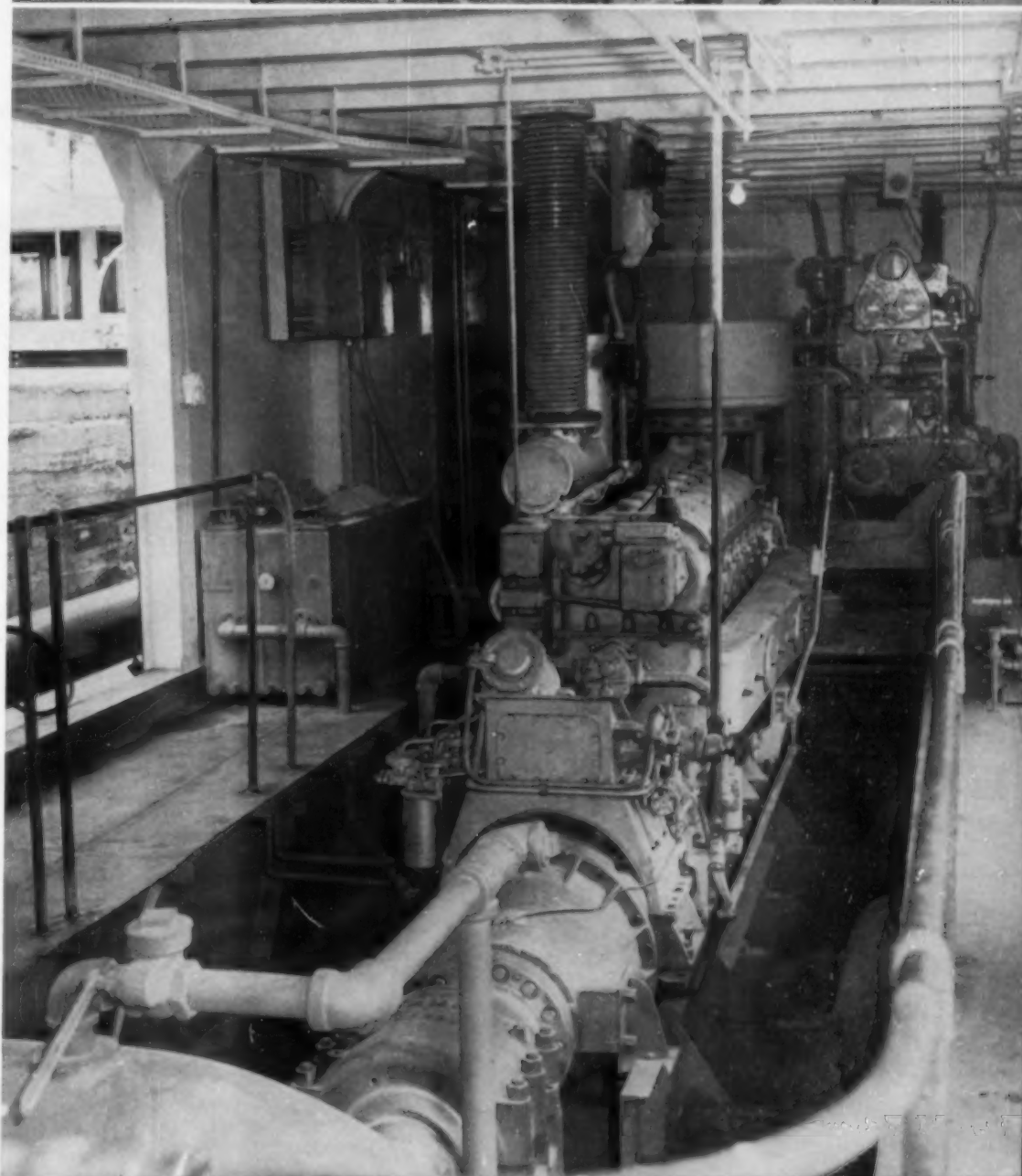
Power is supplied by a General Motors 8-268-A diesel engine operating at 1200 rpm. The engine has a horse power rating of 550 which drives a 10x12 Maddox pump through a Snow-Nabstedt reduction gear. Clutch controls are Twin-Disc.

The main source of electrical power for the cutter motor, swing gear controls and all auxiliaries, is an 8 cylinder Superior diesel engine which develops 152 hp at 1200 rpm and drives a 100 kw Delco 115-230 dc generator.

Other engine room equipment includes Maxim silencers, Ingersoll-Rand air compressor and Southway batteries.

The 22 ft dredge tender, which was built at the same time, is powered by a 4 cyl. Hercules diesel engine rated 79 hp at 2600 rpm.

The inside of the dredge showing the GM Model 8-268-A main diesel equipped with Marquette governor. To the rear is the 152 hp Superior diesel, which drives a 100 kw Delco generator.



THIEF RIVER FALLS, MINN.

By DOUGLAS SHEARING

IN November, 1955, the City of Thief River Falls, Minnesota, wrote still another chapter in the municipal plant's 43-year history of power production and profit. In that month the city put into service a new 1900 hp Fairbanks-Morse opposed-piston diesel, bringing installed diesel capacity to 8,050 hp. In the five years 1951 through 1955, despite a rate schedule comparable to others in the area, this plant achieved a total net profit of \$865,864.38 and contributed to the General City Fund a total of \$725,895.75. Choice of the new O-P diesel must be credited in large measure to the city's experience with its first O-P, a 1600-hp unit which went into service in January, 1952. Plant engineers could not help but regard this engine with some affection since it went to work in record time to avert an impending power shortage. One of the plant's older diesels, a 1,000-hp unit, was badly damaged in November, 1951, and had to be dismantled. Unless a replacement could be rushed into service, the plant might not be able to carry the approaching Winter peak loads. The City decided on a 10-cylinder Model 38D8-1/2 Fairbanks-Morse opposed-piston diesel rated at 1600 hp at 720 rpm which not only would provide a needed increase in generating capacity but would fit easily on the foundation of the 1,000 hp engine. Recognizing the emergency a power station in Iowa waived its priority on a new O-P and it was delivered in Thief River Falls on December 6th. Exactly one month later, on January 6th, the new prime mover was put into regular service.

Having saved the city the cost of a foundation and precious installation time, the diesel went on to earn additional dividends by improving the operating efficiency and economy of the plant. In 1951, last year before the O-P, the plant's diesels produced 8,231,400 kw hrs while consuming 635,186 gal. of fuel oil, an average of 12.95 kw hrs per gal. In 1952, the O-P's break-in-year, plant diesel production was 8,981,100 kw hrs on 676,054 gal. of fuel for an average of 13.28 kw hrs per gal. In 1953, production was up to 10,599,100 kw hrs with fuel consumption of 784,395 gal., an average of 13.51 kw hrs per gal. In 1954, the plant's diesels generated a total of 11,231,600 kw hrs and consumed 818,045 gal. of fuel, bringing the average up to 13.72 kw hrs per gal. of fuel. In 1955, total diesel generation was 13,444,900 kwh, at a fuel consumption of 978,198 gal. for an average of 13.74 kw hrs per gal.

Thief River Falls is the trading center for a broad agricultural area with a radius of 100 miles in west central Minnesota. Cattle, beets and flax are among the chief products of the region and it is one of the largest turkey shipping centers in the United States. The City has a population of about 7,500 and has three poultry processing plants, seven elevators, and one machinery manufacturer in addition to the large number of stores. The city

was a pioneer in the generation of power with internal combustion engines, starting with a pair of 250-hp semi-diesels in 1912. It was natural that the City should turn in search of power resources to the river and falls that give it its name and in 1917 it purchased from a local mill the dam rights and a 185 kw vertical wheel with wooden drive. The year 1927 brought major expansion in both engine and hydro capacity with the installation of two 500 hp. G-E hydro turbines and the plant's first full diesel, a 750 hp McIntosh & Seymour air-injection engine. In 1934 came the 1,000 hp Busch-Sulzer mechanical-injection diesel and in 1941 another B-S unit of 1750 hp. The plant's largest engine, a 2800 hp Nordberg, was installed in 1948. Then came the 1600 hp Fairbanks-Morse opposed-piston diesel to replace the 1000 hp unit in 1952 and finally the 1900-hp F-M engine to replace the 750 hp unit in 1955. Once again the O-P proved its compactness by fitting neatly on the foundation of an engine with less than half its power.

The plant naturally gets all the generation it can from the hydro units but water flow has diminished through the years and in 1954 contributed only 19 percent of the plant's total production. It is to the diesels the City looks for the bulk of its power and the diesels must have capacity to handle the steady load expansion. Prior to the installation of the second O-P, the normal operating schedule had the 2800 hp unit on the line from 7 am to 10 pm on weekdays, with the 1600 hp O-P running from 10 pm to 7 am weekdays and steadily from 10 pm Saturday to 7 am Monday. Hydro power and the older diesels were used to supplement these two main prime movers. The new 1900 hp O-P will give greater flexibility and permit use of modern, efficient engines to generate a higher percentage of total output. The original

O-P diesel got its first overhaul after 10,763 hours of operation and Chief Engineer Morris L. Owen reports there was no measurable wear on either bearings or liners. The engine was clean with no sign of varnish in the cylinders. The top two rings were replaced, a new timing chain put in and the engine was ready to go back to work.

It is evident that the engine is well lubricated. The detergent-type oil is circulated through the engine and a full-flow filter under pressure and some is bypassed through a cellulose cartridge-type filter. The bypass filter is in continuous service with a motor-driven pump to bring oil from the crankcase when the engine is not in operation. Mr. Owen keeps a watchful eye on the condition of the lube oil, having it analyzed every 1,000 hours. Reports show the oil in good condition. The engine has been averaging in the neighborhood of 4000 rated hp hrs per gal. of Standard Oil of Indiana lube oil.

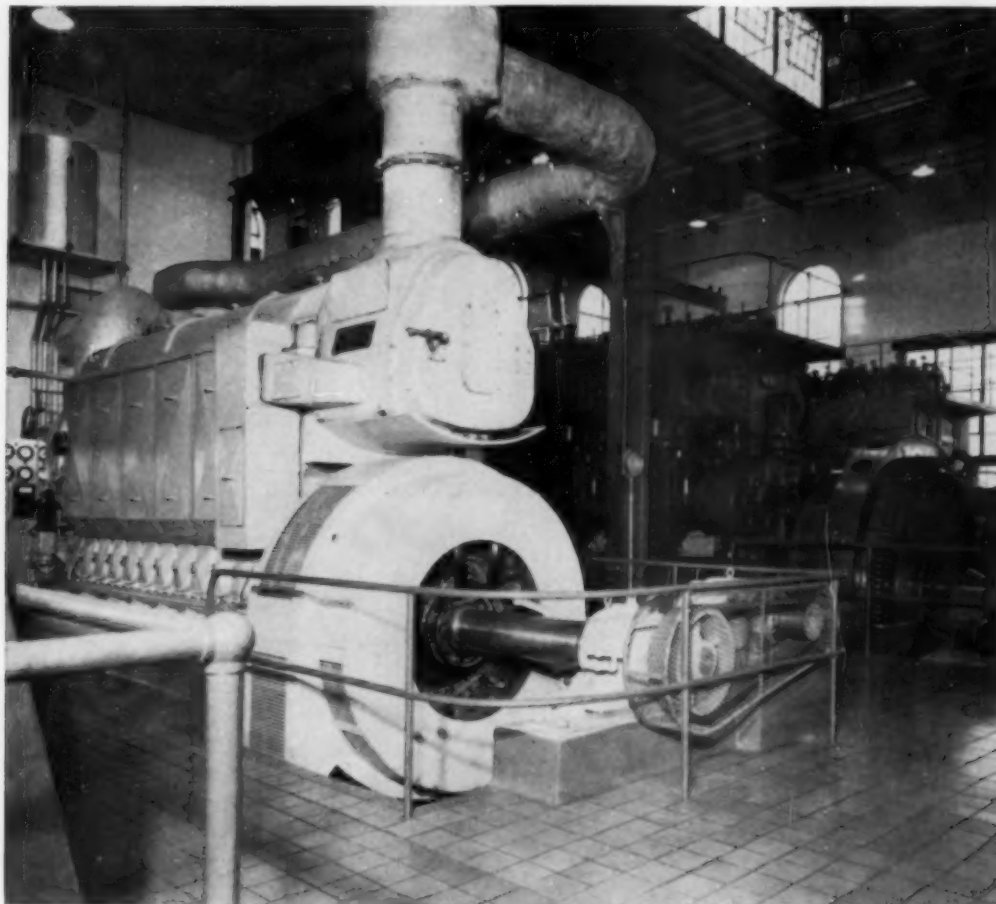
All the Thief River engines are straight oil-burning diesels, burning a 24 gravity fuel oil. A spur of the Great Northern Soo line runs right past the plant and fuel is delivered by tank car. The oil is unloaded into a pair of storage tanks outside the plant; then centrifuged and stored in a second pair of tanks inside the building. A motor-driven transfer pump lifts the fuel to a 250 gal. elevated day tank for each engine and the oil then flows by gravity to the engine supply pumps, then through duplex filters to the injection pumps. When natural gas becomes available, the two opposed piston engines and the 2800 hp unit will be converted to dual fuel operation. Scavenging air for the O-P is drawn through viscous impingement filters mounted on the brick structure which houses the vertical exhaust snubber. Fans are arranged to

TABLE I

	KILOWATT-HOURS GENERATED					
	O-P	Total Diesel	Hydro	Total Plant	Engine Hrs. O-P 10-cylinder	Engine Hrs. O-P 12-cylinder
1951	—	8,231,400	2,759,800	11,091,200	—	—
1952	2,583,800	8,981,100	2,829,500	11,810,600	3,218	—
1953	3,497,500	10,599,100	1,874,600	12,473,700	4,130	—
1954	3,314,700	11,231,600	2,650,200	13,881,800	4,225	—
1955	4,768,700	13,444,900	1,928,200	15,373,100	4,403	638
1956—10 mos.	5,333,400	11,583,200	1,888,800	13,472,000	2,901	3,214

TABLE II

	1955	1954	1953	1952	1951
Operating Revenue	\$456,447.00	\$411,911.79	\$376,041.67	\$484,870.74	\$317,871.70
Operating Expense—Plant	173,050.00	184,359.15	168,523.18	150,721.00	143,342.57
Operating Expense—Distribution	12,948.00	19,542.95	16,761.25	15,908.32	14,945.05
Operating Expense—Administration and General	16,508.00	21,339.51	19,740.68	16,640.87	19,518.66
Net Profit	207,639.00	186,670.18	171,516.56	165,195.26	134,843.38
Contributions to General City Fund	199,500.00	216,040.00	118,540.00	107,000.00	84,815.75



draw air from this snubber building to heat the plant at night. A gauge panel near the engine holds pressure and temperature gauges, an alarm system and a multi-point exhaust pyrometer. The plant operating staff does all its own maintenance work, carefully allocating costs to the individual engines. Repairs to the O-P have been minor and in nearly four years of service, the engine has not had a single enforced shutdown.

The plant is operated by Mr. Owen and his staff under the policy supervision of Mayor Dr. Orion D. Beich and the City Council consisting of Chairman A. B. Stenberg, Council President A. F. Berge, and Robert Carlson, council vice-president. Other council members are J. H. Winjum, F. W. Nichols and Stanley Sandvig. Financial operations of the light and water department are handled by City

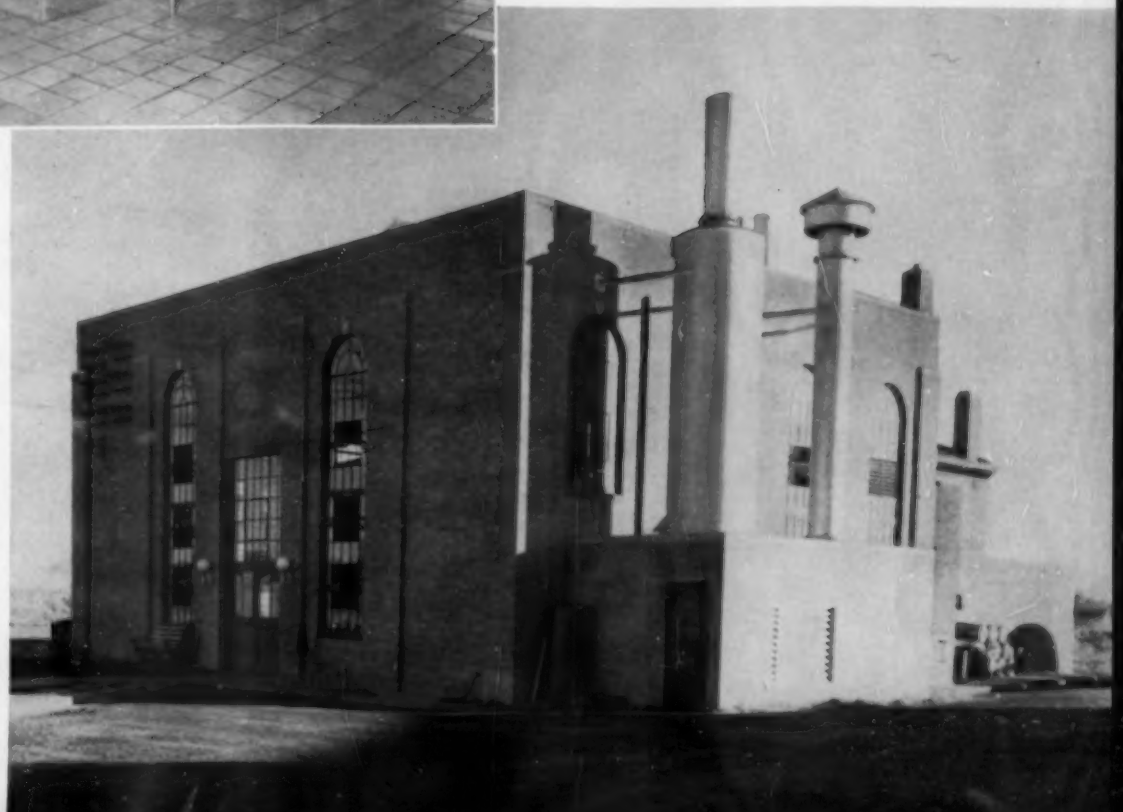
Clerk P. G. Pederson. Despite its moderate domestic rate schedule ranging from a high of 5.4 cents a kw hr down to 1.13 cents for electric water heating, the plant shows a large and growing profit every year. Table II gives figures for the last five complete years, showing how profit has moved up steadily from \$134,843.38 in 1951 to \$207,639 in 1955. Contributions to the General City Fund hit a peak of \$216,040.00 in 1954 and totaled almost three quarters of a million dollars for the five years. As a result of these contributions, Thief River Falls has the lowest tax rate of any city of comparable size in Minnesota. With its second O-P in service, the City is realizing greater production, greater efficiency and greater profits.

List of Equipment

Engine	Fairbanks-Morse 10-cylinder, 1600 hp at 720 rpm opposed-piston diesel
Alternator	Fairbanks-Morse 1136-kw
Governor	Woodward
Fuel oil filters	Nugent
Fuel oil transfer pump	Viking
Lube oil	Standard Oil of Indiana
Lube strainer	Air-Maze
Auxiliary lube pump	Roper
Lube cooler	Ross
Heat Exchanger	Ross
Thermostatic valves	Fulton-Sylphon
Air Filter	Air-Maze
Exhaust snubber	Burgess-Manning Corp.
Pyrometer	Alnor

This view shows three of the four engines at Thief River. Left to right are the 1600 hp Fairbanks-Morse O-P, the 1750 hp Busch-Sulzer and the 2800 hp Nordberg. The new 1900 hp Fairbanks-Morse O-P was installed in the area to the left.

The municipal power plant at Thief River Falls, Minnesota, now houses four diesels, including a 1900 hp Fairbanks-Morse opposed-piston unit installed in November, 1955.



JOHNSON MOTOR LINES TO THE FRONT

**Progressive Trucking Firm
Sets Records With 136 Cummins
JT6B Equipped International Tractors.**

By ARNOLD B. NEWELL

CHARLOTTE, N. C. — Every hour of the day, and every day of the week on the highways and the thruways between Atlanta, Georgia and Boston, Massachusetts, the tractors and trailers of the Johnson Motor Lines are rolling with loads of general commodities. With a total fleet of 750 units operating between 19 terminals, this company has 360 road trailers made by Strick, Fruehauf, Brown, and Great Dane, drawn by 136 new International Harvester tractors powered by Cummins JT-6B diesels of 175 hp each, 112 of which are Model DC-405-L and 24 are RD-205-A, both models being equipped with Fuller RoadRanger transmissions and R-100 axles. These tractors average 13,000 miles per month and transport 13,000,000 lbs per week in a general freighting service which includes store-door deliveries in the 12 coastal states between Georgia and Massachusetts. The annual volume is \$11,000,000.00 including local interstate deliveries between North and South Carolina

and Georgia. The run from Atlanta to Charlotte requires 8 hours with one driver and the run from Charlotte to Boston requires 26 hours with two drivers taking turn and turn about in sleeper operation, stops being confined to meal time and speed conforming to the legal limits of the states through which they pass. Not all the hauls are thru trips. The diesels perform on open highway work, the rest being done with trucks powered by gasoline motors on short hops.

A line-up of tractors undergoing routine inspection and being fully prepared for the long run to New England. Everything from engine rebuilding to a new paint job can be taken care of by the Johnson organization of well trained mechanics.





To keep the Cummins JT-6B engines clean internally the Purolator dry type micronic air filter is carried outside the hood on this IH truck. For clean oil the unit is equipped with a Wix lube oil filter.

An enviable record in the motor carrier industry has been established by this company according to Mr. Maurice E. Sheahan, the amiable president of the operation. He states that the company was established in 1946 with 31 pieces of equipment and 41 employees. They initially operated out of terminals in Charlotte to New York and New England and the first year of business totalled a million dollars. With present facilities they total 24 million miles per year and the annual volume has increased eleven fold. This company is now the sixth largest carrier on the Atlantic seaboard.

The new fleet of tractors replaces an older fleet of International Harvester LCD-405's powered by Cummins NHB diesels of 200 hp and R-95-C Fuller RoadRanger transmissions. The older tractors had been accumulating an average of 15,000 miles per month and had built up an average of half a million miles before they were traded in. Transmis-

sions had averages of 300,000 miles between overhauls. However current routine maintenance calls for engines and transmission rebuilding in the newly established maintenance shop every 212,000 miles. It is a matter of interest that the new tractor, as compared to the older, shows an average gross tractor weight saving of approximately 2900 lbs, and it carries an average pay load of 6000 lbs more than they were able to carry with the older more powerful units weighing 14,100 lbs compared to 11,200 lbs for the newer ones. Fuel mileage is also improved with the lighter tractor averaging 6.7 miles per gallon compared to 5.7 miles for the older units in the Fleet.

General maintenance facilities of the Johnson Motor Lines have been improved with a move to a building of 18,000 sq ft on a location with 150,000 sq ft of yard facilities at 220 Dalton Ave., Charlotte. The extreme cleanliness and orderliness of

this facility is a pleasure to behold. The rebuild room is air conditioned and in a cleaner and more orderly state than any shop we have visited in the past. Transmissions, axles, diesel fuel injection pumps, starters, generators and the vast miscellany of mechanical equipment are all rebuilt in this shop. Manufacturers of the original equipment cooperate in conducting schools to train the mechanics at this shop and for this reason factory methods are followed by the trainees.

Before entering into a discussion of the general maintenance plan set up at the new shops, I want to give credit to three items of accessory equipment which deserve special attention. One of these is the Purolator dry type micronic air filter described in detail in the March 1955 issue of DIESEL PROGRESS. The second is the Wix oil filters well known to our readers. Without properly cleaned air and oil, no diesel can turn in the kind of performance record, long continuous operation and dependability chalked up by the Cummins diesels in the Johnson fleet. Another item which has no particular bearing on the longevity of the engines and the other mechanical equipment but plays a very important role is the Delco-Remy starting system. Absolute dependability in starting is essential to the maintenance of clock-like movement en route. Of even greater importance is the kind of attention given to each phase of service and maintenance of the equipment and for that Mr. W. E. Hampton, Director of Maintenance and Mr. George Lloyd, Shop Foreman, should take a bow.

The program of periodic inspection and complete maintenance established at the new shop is based upon standards set up by measuring the wear of every part of the complete tractor after 100,000 miles of operation. All working parts in the engine were measured by micrometer to establish wear and inspection limits. Pending accumulation of further data, the inspection system, subject to change with accumulation of experience is as follows:

Inspection A—6,000 miles—oil change, visual inspection of all external moving parts. Inspection B—18,000 miles, valves, injectors, pressure drop across air cleaner, and change magnetic plugs on transmissions, rear, etc. Inspection C—72,000 miles, change transmission lube oil, rear end lube, pull all wheels, replace and rebuild injectors, change transmission filter cartridge, plus A and B inspections. Inspection D—212,000 miles, rebuild transmission and engine.

This brief outline of the routine maintenance procedure reveals a prime reason for the mileage of the equipment and its dependability on long steady runs on the open highway. The service facilities include not only the rebuilding of engines and equipment of a mechanical nature in an air conditioned unit overhaul room, but also three lane service where each unit will be completely prepared for each trip by greasing, fueling, brake adjustment, oil and tire changes, and also mechanized washing. A modern paint shop is part of the overall setup. With the modern emphasis on increased dependability to better serve the shippers, the facilities set up by the Johnson Motor Lines will assure the greatest degree of freedom from unwanted delay.

HARBOR TUG *KINGS POINT* PACKS 2100 HP

By ARNOLD B. NEWELL

BALTIMORE, Maryland—In this busy sea port and shipbuilding center one of the most interesting and significant developments in tug boat design and contemporary powering was demonstrated on the harbor by the owners, Curtis Bay Towing Company. The boat is the tug *Kings Point* with a powerplant of 2100 hp. Named in honor of the United States Merchant Marine Academy at Kings Point, N. Y., the vessel's commissioning has attracted many notables to the colorful ceremonies here. The first impression of the boat at the dock is a modern, handsome silhouette, a touch of the streamline motif and a thing of power equal to the arduous tasks it will be called upon to perform locally and no doubt in open ocean towing. The superstructure is white, the hull black and the stubby streamline stack carries an emblem symbolizing the house flag of the owners. Superstructure is foreshortened, leaving a broad expanse of rear deck for working the dacron hawsers and at the same time permitting the strong towing bitts to be placed far enough from the stern to permit pivoting in the manner of the European tug, while retaining the characteristics of American vessels of this type.

An innovation, at least so far as the writer has observed, is the use of heavy Goodyear rubber bumpers fore and aft instead of the puddins woven out of rope which have always been a picturesque part of the tug boat, but without which the overall lines are more readily apparent. It is believed that the rubber's greater friction on the hull of a ship being pushed in docking will be advantageous and there may be some elements

of economy in maintenance. Incidentally, there is considerable tumble home to the bulwarks to keep them clear of overhanging tows alongside. Guard rails are the usual half round split steel tubing welded fast. The interior is surprisingly spacious, utilitarian in the extreme and comfortable. Johns Mansville insulation is covered by fibre glass fabric attached with Nelson Head studs with round flat tops. Driven through to the steel of the cabin they are bonded in place by electrical fusion. Interiors are white enameled. Staterooms for crew are semi-private. The captain has a large private room abaft the pilothouse.

The pilothouse is roomy and fully equipped with modern navigational aids and remote control of the steering engine and the main propulsion system. Finger-tip steering control is installed at each side of the pilothouse in addition to a conventional wheel. Always the most interesting part of a boat, the engineroom, is remarkably spacious in all respects, including headroom. Auxiliaries are neatly installed and take up little space. Overhead tracks, one for each cylinder bank provide convenient lifting facilities. The galley is roomy and comfortable with an electric range, a combination refrigerator and freezer, well arranged racks for dishes and utensils, stainless steel sink and work board, ample food storage space and a table and five fixed chairs, plus a settee at one side, making eight places in all.

On December 12th, Alco Products Inc. took a large party of guests including naval architects, shipbuilders and vessel operators to Baltimore

and the Curtis Bay Towing Company demonstrated the *Kings Point* on the harbor with guests aboard. She went through her paces with flying colors. No official trial trip data were taken. A spot check showed a speed of about 13.7 knots. On a crash maneuver from full ahead to full astern it took 13 seconds to start astern power and 32 seconds to come dead in the water. On a hard-over swing the circle was about a boat length and a half. She rolled but little in a full power figure 8. To my way of thinking this was an adequate demonstration in excess of the maneuvers employed in service. I shall state some particulars of the machinery installation shortly, but first, the observations made in the engineroom during full speed maneuvers are worth mention. The main engine at full power ran smoothly, quietly and without smoke at the exhaust. Upon going from full power ahead to full astern, the Hindmarch-DeLaval reverse and reduction gear remained quiet and free of vibration with no apparent stress. Standing with one hand on the casing I could detect nothing unusual, no sound, no labor and the engine took the momentary overload with equal ease. I could feel and hear the rumble of the propeller that always occurs when a boat with headway starts backing at full power. All of this is normal and to be expected.

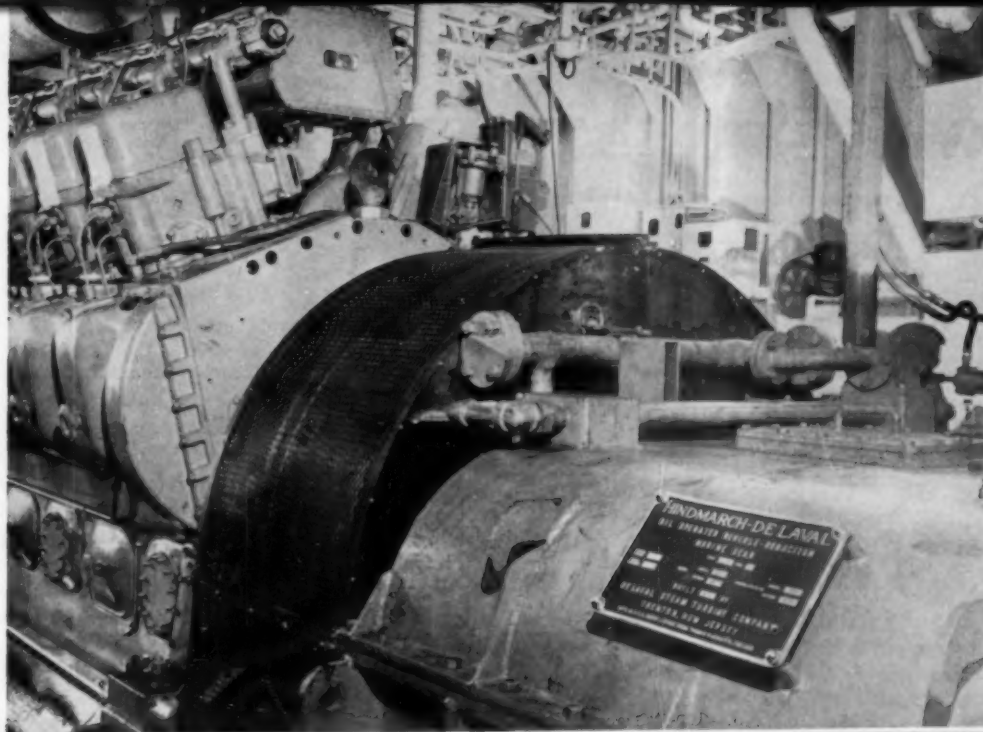
Such is the overall impression of this boat which is a sister ship to another, named *Fells Point* coming out soon with identical characteristics as follows:

Length oa	105 ft
Length bp	92 ft 6 in.
Beam molded	27 ft
Depth	14 ft 8 in.
Draft	13 ft
Displacement	400 tons
Power	2100 shp
Speed running free	13.7 knots
Fuel Capacity	48,740 gal.
Fresh water capacity	8,320 gal.
Operating range	22½ days

The two sisterships were built as bare boats by the Equitable Equipment Company of New Orleans and the owners made the machinery installation and did all the fitting out as well as the interior finish at their own plant. Both parties to this joint operation did a good job of it aloft and below.

While the Curtis Bay Towing Company hardly needs an introduction, it is appropriate to state that this old, well known company is one of the largest operators of tugs in the country. They have always employed good vessels and they miss no opportunity to take full advantage of modern machinery and equipment as it becomes available. Utilization of greater power in this harbor tug will enable them to handle the very large ore boats and super tankers appearing with greater frequency on the high seas. The engineroom houses





an Alco Model 251-B, 9 x 10½ in. engine that develops 2100 bhp at 1000 rpm. It has an overall length of 31 ft and weighs approximately 44,000 lbs dry.

It is equipped with an insulated exhaust manifold, Ingersoll-Rand air-motor starting system, a Woodward PG governor, and it is controlled by Westinghouse Air Brake Company pneumatic controls. The high output turbocharger is of Alco design and manufacture. The engine on 4-point mounting has a cradle type outboard bearing and a stub shaft to connect through a Falk Airflex coupling to the reverse-reduction gear, which is independently mounted on the machinery bearers. This coupling not only prevents trouble that might result if any misalignment occurs but it also effectively separates any small torsional crankshaft vibrations not dampened out by the Houdaille vibration dampener and any others that may occur in the mass elastic system of gearing. The Westinghouse pneumatic controls permit operation both from the pilothouse and the aft control station. Maxim Silencers are used on the exhaust.

Direct drive to a 4-blade Engstrand-design bronze propeller supplied by Ferguson Propeller Company is provided from the engine through a Hindmarch-DeLaval Model M 2 WR size 5A reverse reduction gear unit with input speed of 1,000 rpm and output to the propeller of 250 rpm. This reduction gear, one of the first American-made units to be installed in marine equipment, is oil operated and is supplied with Kingsbury thrust bearing and necessary oil pipe and fittings. The ahead and astern wheels incorporate oil-operated clutches. Each clutch has two inner and two outer members, forming the ahead or astern reduction gear as may be the case. The inner members are carried on a shaft with longitudinal splines, and the outer gear members of the clutch are free to rotate on the hubs of the two inner members and are not directly connected to the shaft. The inner members are free to move axially on the longitudinal splines of the shaft within the outer members.

Auxiliary power is provided by port and starboard General Motors Model 71, 3-cylinder diesel gen-



erator sets, equipped with Delco, 40-kw dc generators. A 56 cell set of Exide storage batteries supplies electricity while the generators are not running. Other engineroom equipment, includes a 5 hp Montgomery Elevator Company steering gear using Link Belt mitre boxes, a 5 hp Worthington fuel oil transfer pump, Lancaster self-contained sanitary pressure pumps, Lancaster freshwater pumps, two Quincy air compressors to provide starting air and operate the controls, an eight-cartridge Michiana lube-oil filter, Cuno lube-oil strainer and a Young Radiator Company cooler. The jacket water cooler for the closed cooling system was supplied by Young Radiator Company and the temperature control for the unit was manufactured by Amot. A 30-hp fire and general service pump was made by Goulds Pumps. Hot-water heat for the tug boat is provided by an Esso heating plant that burns diesel oil.

Topside the *Kings Point* has a Western Gear Company 20 hp capstan aft, and a 15 hp bow capstan was supplied by McKiernan-Terry Corporation. The heavier stern capstan is necessary for towing operations. Radio Corporation of America radar and radio-telephone is installed in the wheelhouse to aid navigation, while atop the wheelhouse there is a Mile-Ray electric searchlight and a 300 gpm fire monitor. The tug has twin Leslie air horns.

Although I described the Alco Model 251-B in full detail shortly after it came out, I shall review some of the details particularly as they relate to marine uses. It has a fabricated base and block of

This Alco 2100 hp diesel provides propulsion power for the *Kings Point*. It is equipped with a Houdaille Vibration dampener and drives the Hindmarch-DeLaval oil operated reverse-reduction gear in the right foreground through a Falk Airflex coupling located under the screen shroud. Woodward governor is seen above shroud.

The short deckhouse leaves ample room to handle hawsers with the aid of the Western Gear electric capstan shown directly abaft of the superstructure. The streamline stack houses a Maxim silencer on this sharp, trim tug.

steel weldments, an air manifold integral with the block and it is equipped with a turbocharger of the company's own make. The engine driven lubricating oil pump has double the required capacity and it delivers pressurized oil to all major working parts as well as the camshaft, gears, rocker bearings, and turbocharger bearings. Incidentally there is a system of evacuating crankcase fumes through an Air Maze filter to the air inlet duct at the turbocharger. For marine applications the engine may be built with a deep sump base for positive lubrication under 15 degree inclination and list conditions, a bronze engine-driven salt water pump ahead of the shell-and-tube-jacket cooler, an interchangeable bronze jacket water pump, and the engines may be supplied as twins of opposite rotation for twin screw vessels or for reverse-reduction gearing.

It will be remembered that we presented the tug *Cavalier* last year and that the dimensions were similar to the new vessels while the power in that boat is a pair of 900 hp Alco engines. Therefore the Curtis Bay Towing Company is accumulating experience with these engines with the result that Donald Jefferson, superintendent at the company's Norfolk yard remarked, "We expect these tugs will follow in Baltimore the tradition of reliable service set by the *Cavalier* in and around the lower Chesapeake ports of Norfolk and Portsmouth. Based on our experience with Alco built engines, the tugs' prime movers should contribute a great deal to the work-a-day life anticipated for the new boats."

FLORIDA'S SEWAGE TREATMENT PLANTS

By ED DENNIS

SANITARIAN Bans Septic Tanks in Undeveloped Areas," headlines a Florida newspaper. "Lack of Sewage Disposal, Not Land, Could be the Factor Limiting Dade County's Growth in the Future," reads another editorial. The staggering sewage problem being caused by the industrial mushrooming of Florida is a matter which has created a headache for the various county health authorities. More than 5,000 industrial plants are now scattered throughout Florida and hardly a week passes without the announcement of some plan for a large new plant for the state. More than 500 million dollars has been spent on industrial expansion since the 1940's.

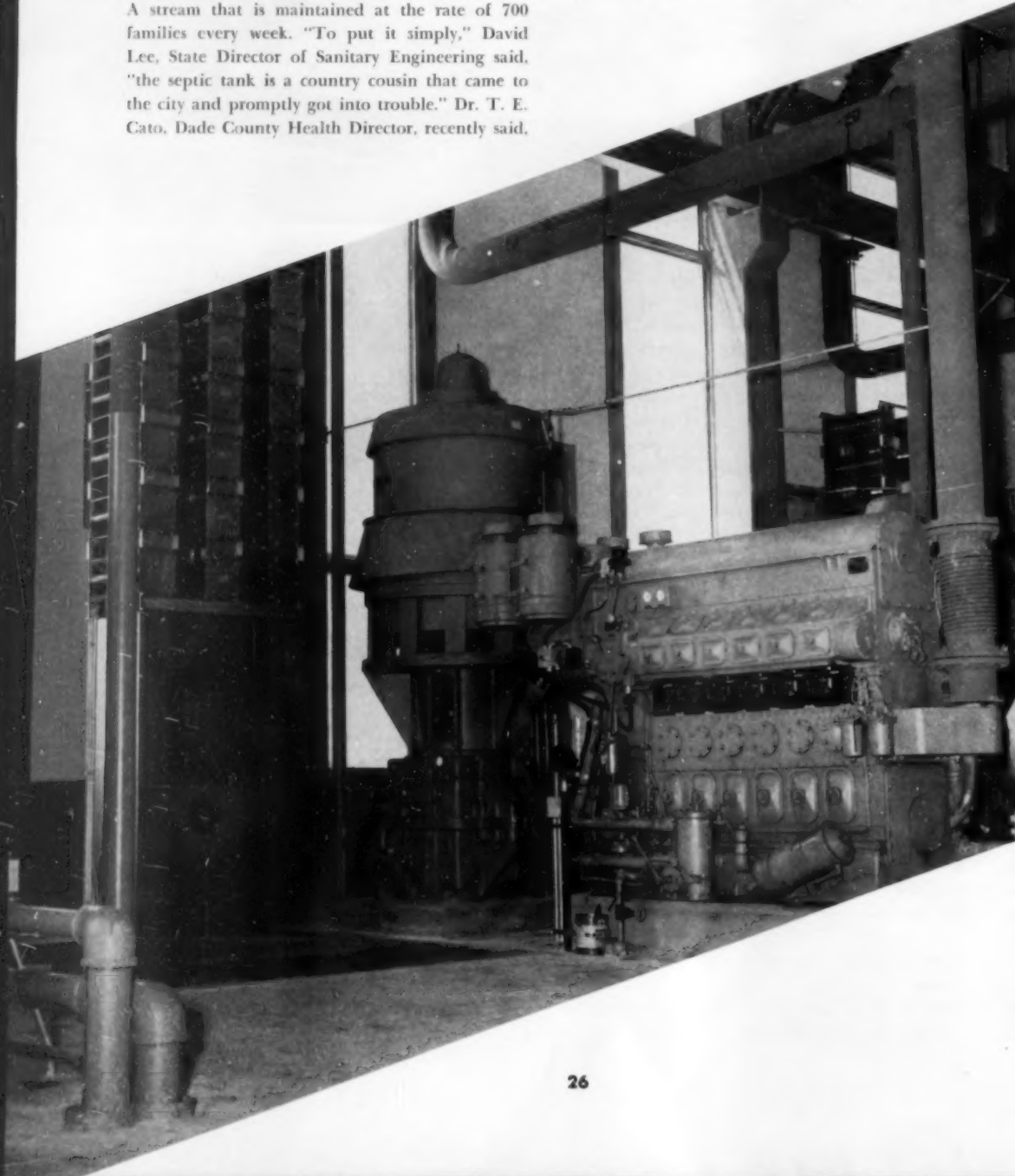
Another factor which is contributing to the seriousness of Florida's sewage problem is the steady stream of people heading for this Sunshine State. A stream that is maintained at the rate of 700 families every week. "To put it simply," David Lee, State Director of Sanitary Engineering said, "the septic tank is a country cousin that came to the city and promptly got into trouble." Dr. T. E. Cato, Dade County Health Director, recently said,

"the Backyard Betsy, commonly known as the septic tank, is destined to take its place with the out house as a relic."

These are just a few of the reasons why millions of dollars are being allotted for the construction of sewer disposal plants by the various communities in Florida. It will be instructive and interesting to examine briefly a small group of Florida's sewage treatment plants that have been built recently and use diesel engines. The \$800,000. water and sewage system for Westwood Lake, a housing project being developed by The Mackle Co. in South Florida, was designed by Philpott, Ross & Saarinen, Consulting Engineers. The sewer system consists of a high rate trickling filter plant which is designed to treat 1,800,000 gpd of raw sewage. Most of the sewage treatment is accomplished on the

4 foot deep, 70 foot diameter filter bed, thus the biological life growing on the rocks reduces the organic matter to inoffensive inorganic compounds.

Sewage from the subdivision enters the plant in the bar screen comminutor chamber through one gravity sewer and one force main. After passing through the bar screen-comminutor chamber, the sewage flows into the plant lift station. It is then pumped into the primary clarifier from where it flows by gravity to the trickling filter (80 ft dia.



◀ This is one of the three model 38F5 1/4 Fairbanks-Morse diesel engines rated 450 hp at 1200 rpm. Each engine has 4 Air-Maze oil bath air filters. At the Miami 4th Street pumping station each of these three diesels has a Philadelphia gear works drive with a 1.73:1 ratio through a Poole flexible coupling to a Fairbanks-Morse 350 hp 703 rpm electric motor. This dual drive installation permits the diesels to be used in case of a power failure. Thirty feet deep, in the lower part of the station, are five 10,000 gpm Fairbanks-Morse 20 inch pumps.

4 ft deep). The filter effluent is lifted by two 2100 gpm pumps to the secondary clarifier (55 ft dia.) and passes from this clarifier to the chlorine contact chamber by gravity. From the chlorine contact chamber the liquid is discharged perfectly harmless into Snapper Creek.

The Dorr-Oliver biofiltration process is used with recirculation from the sludge hopper of the secondary clarifier to the inlet of the primary clarifier. The recirculation is accomplished by gravity as the secondary clarifier is approximately two feet higher

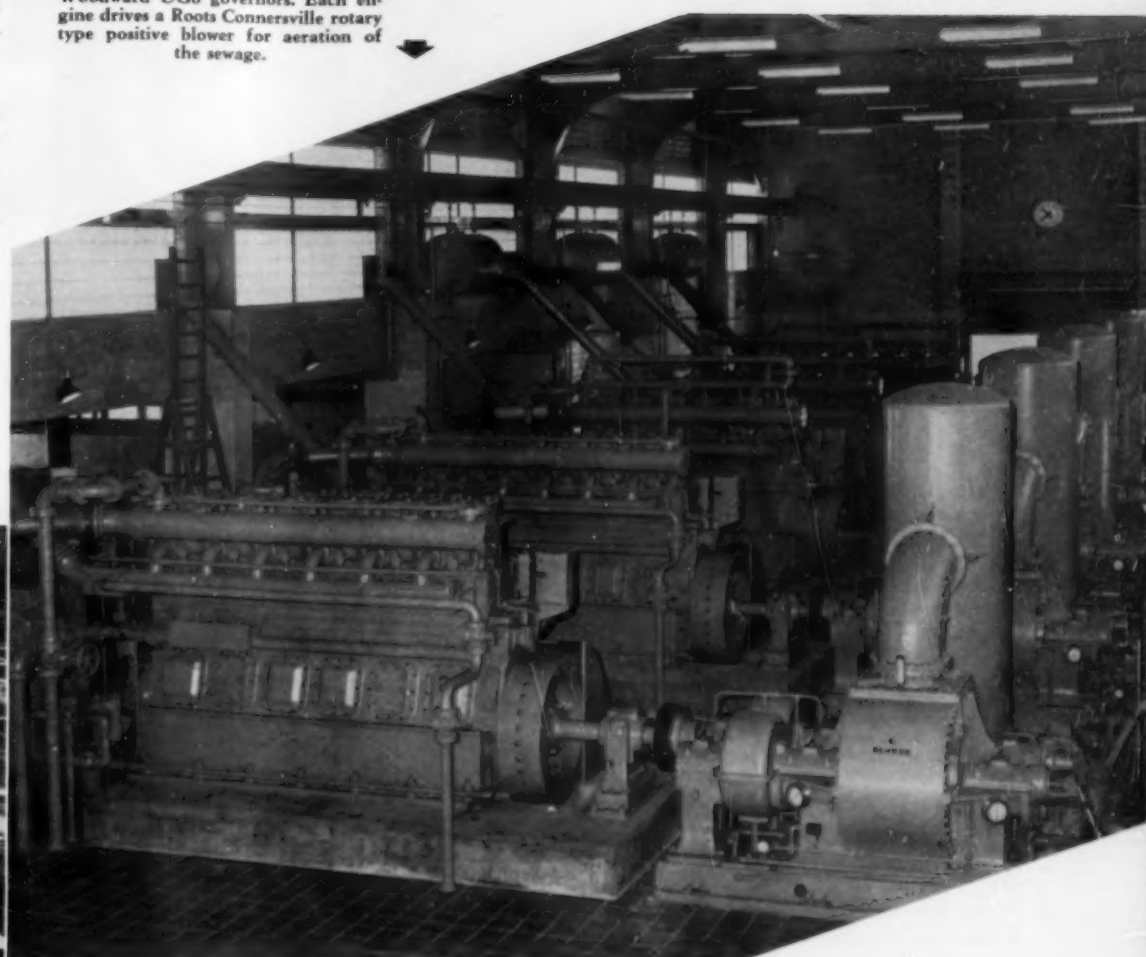
Aerial view of Westwood Lakes, a 3500 home development, being built by The Mackle Co., largest builder and developer in the South. They are also building projects in Pompano Beach Highlands and another near Punta Gorda. All have their own sewage treatment plants. The \$800,000. water and sewage plant is shown in the foreground.



in elevation than the primary clarifier. Since recirculation from the secondary clarifier is from the sludge hopper, all solids are drawn from the primary clarifier to a sludge hopper and are then pumped to the digester. A well equipped laboratory is located at the plant for running control tests for B. O. D., solids, pH, and chlorine residual. A 180 bhp Worthington dual fuel engine rated 125 kw is used as a standby emergency generating set in case of power failures.

Miami has been truly called the "magic city." Its phenomenal growth from a small tropical village to America's winter playground in a little over 50 years, is something to be proud of. But the waste materials from the increased population that came to live in this new tropical setting was dumped

The four 6 cyl. 410 dual fuel Worthington engines of the City of Miami at Virginia Key, model CCG6. They have Burgess-Manning snubbers and Woodward UG8 governors. Each engine drives a Roots Connorsville rotary type positive blower for aeration of the sewage.



into the surrounding waters and in not too many years this virgin paradise became a polluted paradise. There were areas where tests showed more than 10,000 Coliform bacteria per 100 milliliters of water sample. The U. S. Public Health Service standards state that water should not contain more than one Coliform organism per milliliter. When 10,000 are present they are definitely a menace to health. Several years ago, Miamians took a big step in the right direction, when they voted for a \$27,000,000. sewer construction project, which included a modern treatment plant.

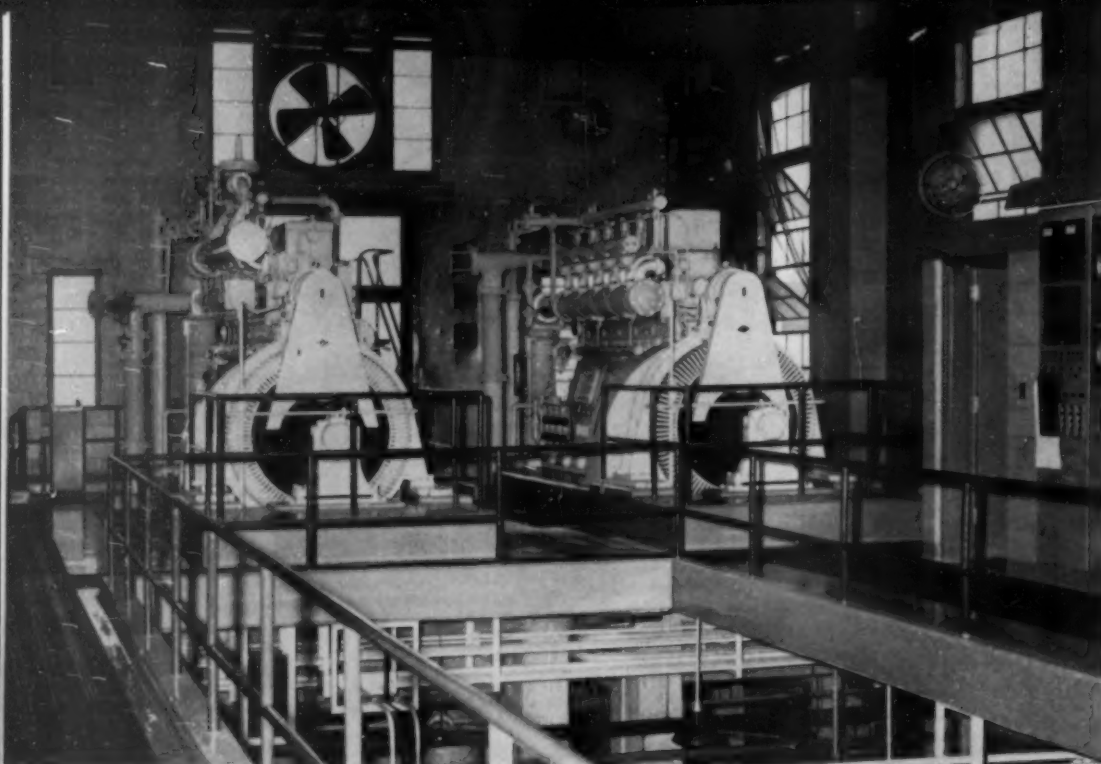
The Virginia Key sewerage plant of the City of Miami, which was put into operation a few months ago, will depend on five Worthington dual fuel engines to keep its famous beaches free from dangerous contamination in the future. The four model CCG6 Worthington dual fuel diesel engines, each rated 410 bhp at 514 rpm, were installed by the Municipal Service Co. of Kansas City, Mo., who had the \$2,400,000. subcontract for the plant's machinery. These engines will be fueled by the gas generated from the digested sludge, after aeration by the Roots-Connorsville rotary positive blowers driven by the engines. The dual fuel arrangement permits changing over from gas to oil or any combination of the two fuels as variable conditions may require.

Also at the plant, approximately thirty Worthington pumps are installed, to handle sludge, effluent

and other liquids. The 332 kw Electric Machinery 480 volt, 500 amp 60 cycle 415 kva generator, is driven by a model CCG07 Worthington dual fuel engine, rated 480 bhp at 514 rpm. This unit supplies all the electrical power for the operation of the Virginia Key Sewerage Treatment Plant. As dependability is obvious, each of the two main pumping stations have for standby use, 3 model 38F5¼ Fairbanks Morse diesel engines, each rated 450 hp at 1200 rpm and five 20x24 Fairbanks Morse 10,000 gpm pumps. Three of the pumps will have dual diesel engine and electric motor drives. The other two will have 350 hp Fairbanks Morse induction type motors. For emergency standby power a 124 Murphy diesel generating set with a 187 kva Columbia generator is used at the pumping stations for full protection.

The interceptors are designed to handle the expected increase in population of 453,000 persons which will be about 1980. The Virginia Key sewage plant can handle 47,000,000 gallons of raw sewage a day and can be expanded to 68,000,000 gallons daily for the 1980 population quite easily. A Miami City engineer estimated it would take an additional \$30,000,000. to run new sewer lines to all the residences and businesses in the city.

With an eye on the future, Miami is going ahead with an additional \$9,950,000 extension to its sewer construction program. This new phase of the program will take about three years to complete. The



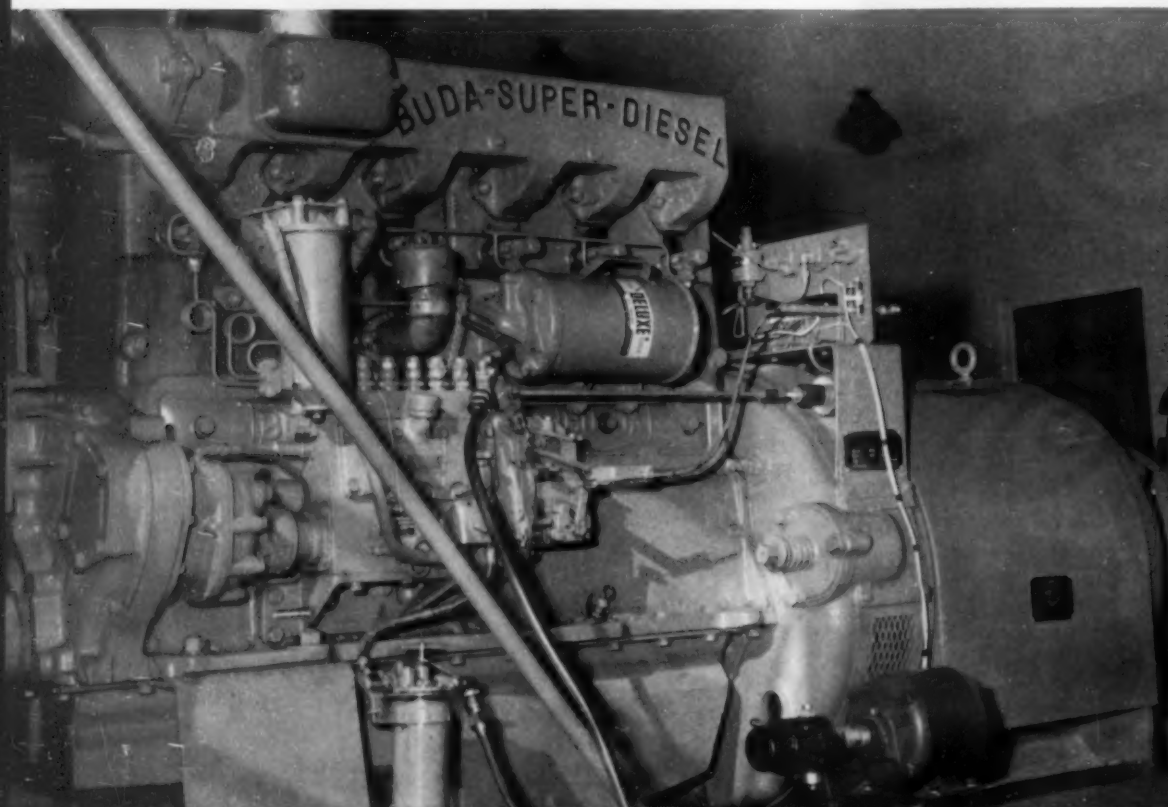
The two Worthington diesel engines at Tampa's \$12,000,000. primary treatment plant, one is a CCG5 gas engine rated 345 hp at 450 rpm having a bore and stroke of $12\frac{1}{4} \times 14\frac{1}{2}$ and driving an Electric Machinery generator. The other is a CCGO5 dual fuel engine rated 300 hp at 405 rpm bore and stroke $10\frac{1}{4} \times 14\frac{1}{2}$ and driving an Electric Machinery generator. Both have Woodward governors, Korfund vibration eliminators, Ross heat exchangers and Maxim exhaust silencers.

new sewage system of the City of Coral Gables is a consolidation of the University of Miami sewer system and the newly constructed facilities which is operated by the city. It now serves the University of Miami and about 1,000 Coral Gables customers. When the plant was enlarged recently, to a maximum capacity of 2 mgd, it was decided to install a standby diesel engine. The new engine is a model 6DAG-970 Buda diesel rated 172 hp at 1200 rpm and an 85kw Delco 3 phase 208-240 volt generator. The treatment plant and the sewer system is expected to be expanded when it has reached its flow capacity of 2 mgd.

Tampa, Florida's big west coast industrial metropolis, is spending about \$10,000,000. on improvements and expansion of its sewage handling facilities. In 1952, Tampa virtually rebuilt its overloaded and outmoded sewerage system. The 35 year old disposal plant, which served only a small section of this industrial city, was replaced with an up to date treatment plant designed for 36 mgd. The city also built five new air ejector stations and transformed a disjointed network of isolated sewers into a new "master plan" system which eliminated a good portion of the serious water pollution problem. A year or two later, Tampa

28

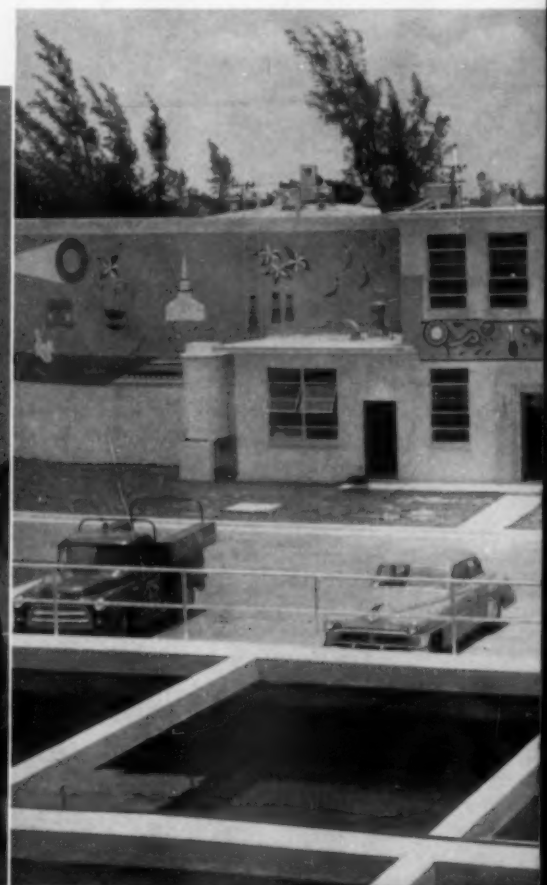
The 262 hp supercharged Buda diesel at the Hollywood sewage treatment plant. This 6 cyl. diesel has a $5\frac{1}{4}$ bore x $6\frac{1}{2}$ stroke with a cubic displacement of 844". It drives an EM generator and has Deluxe lube oil filter and American Bosch fuel oil system.

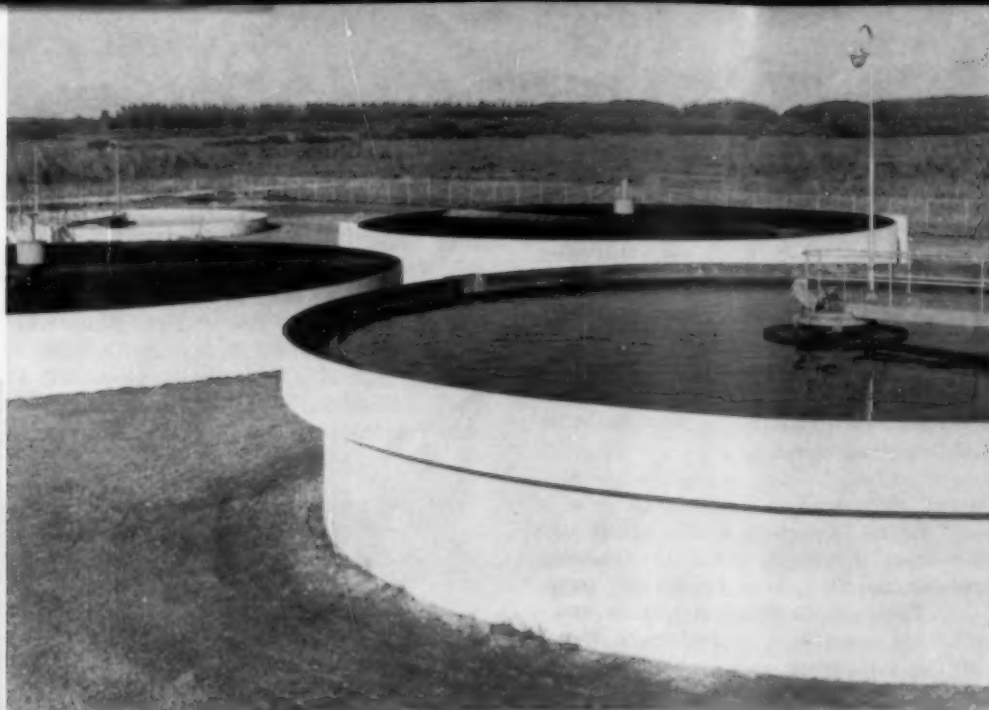


The Hollywood treatment plant tanks, first tank is the 1st primary clarifier, next two are the trickle filtering tanks, then comes the secondary clarifier. W. M. Wright is the superintendent of this new sewage treatment plant.



The Trickle filtering tank, in the foreground, at the Westwood Lakes sewage plant. The 250,000 gallon pressure tank is used in the drinking water system of the development.





↓ The Settling basins at the Coral Gables treatment plant. The building with the murals houses sewage pumps.



was again faced with the need to expand its sewerage facilities, when it annexed about 40 square miles of suburban territory and its population increased almost 80 percent. The newly annexed community's sewerage system was vastly outmoded, in fact some of the facilities dated back to the first World War and outside of a few small disposal plants, the raw sewage was dumped into the Bay or Rivers. The new disposal plant, which has a capacity of 36,000,000 gpd, has more than enough reserve capacity to handle the anticipated increase of sewage for several years to come.

The work completed under the new expansion program has had gratifying results, as the bacteria count in Tampa Bay and the surrounding waters has been remarkably reduced. Before the program was started the count of E. Coli bacteria in the

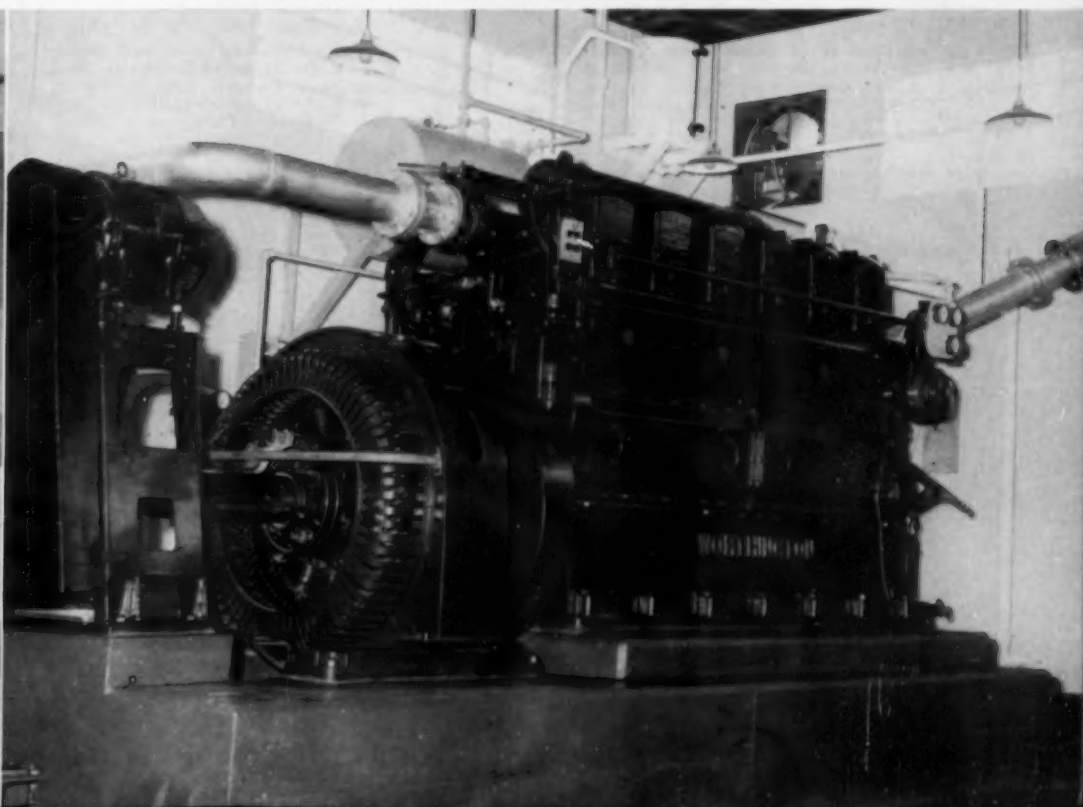
local river ran almost as high as 160,000,000 per 100 milliliter of water and at the same point the count has been reduced to a low of 350 per 100 milliliters. The average in the Bay surrounding the city is approximately 3300 per 100. Tampa is a diversified industrial city with such industries as breweries, cigar factories, meat packing houses and citrus and shrimp handlers. A year or two ago the city's raw sewage averaged about 182 ppm suspended solids of which 65 to 70 percent were removed and a B. C. D. of 182 ppm of which 35.5 percent was removed. When the final phase of this new program is completed and the discharge of raw sewage into the surrounding waters is halted, it is expected that the bathing beaches will once again be in excellent condition.

Still another plant on the Gold Coast is the City of Hollywood's new sewage treatment plant serving a population of about 25,000 with a designed maximum capacity of 10 mgd. This installation protects the famous Hollywood Beach and numerous waterways. Constructed in 1955, this plant uses the high rate trickling filter system. Emergency power is provided by a 262 hp Buda diesel model 6DAS6-844 with an Electric Machinery 150 kw generator 240 volt, 452 amps. The Buda diesel engine can carry the full maximum load of the treatment plant. Four Fairbanks Morse model Q. Z. K. U. 25 hp sewage pumps are used in the pumping system at the plant. This plant uses a treatment process that is very similar to the one used at the Westwood Lake plant.

These and many more sewage treatment plants are examples of sound judgement and practice in the treatment of raw sewage. The millions of dollars being spent is an indication that the citizens of Florida are looking to the future when the waters surrounding this sunshine state regain their old-time blue and green sparkle.

The dual fuel Worthington emergency diesel generating set used at the Westwood Lake housing development, rated 180 bhp at 600 rpm with an Electric Machinery generator. The unit develops 125 kw-480 volts-187 amps, at 60 cycles. A Westinghouse air compressor unit is also part of the equipment in the generator room. A Sims Co. heat exchanger and oil coolers are also used. Ray Sweeney is plant operator.

29



SALT LAKE DIESEL NAVY

BY mid-December the Southern Pacific's biggest construction job was in full swing. Not since the 1860's, in the days of SP's pioneer parent the Central Pacific, has the desolate shore of Utah's Great Salt Lake seen railroad engineering on this scale. But that was in the days of steam. These are the days of diesels, and modern railroading requires roadbeds to match the capabilities of its throbbing diesel locomotives and their 100-plus strings of rolling stock. So, today a salt-water fleet of Enterprise-powered towboats are commencing an unusual assignment 1,000 miles from the nearest ocean. Their equally unusual home port: Promontory Point, Utah, 28 miles south of historic Promontory, site of the historic link forged 87 years ago when the Central Pacific and Union Pacific railroads completed the first transcontinental rail route.

Teamed with six 60-foot and two 54-foot boats will be a half dozen of the biggest hopper-type earthmoving barges ever built—boxlike steel hulls 250 feet long and 55 feet wide, capable of hauling 2,000 cubic yards of earth and rock. Working 'round the clock they'll move fill material for the Southern Pacific's unprecedented \$49,000,000 project that will replace a 12.7-mile timber trestle (the world's longest) with 32,000,000 cubic yards of solid embankment. The SP's Lucin cut-off across Salt Lake was built in 1903 to eliminate 42 miles of the original route around the north end of the lake. The entire project extends for 103 miles between Ogden and Lucin, far to the west, and includes a 32-mile stretch where the railroad "goes to sea" on narrow dirt fills linked by the famous pile-supported trestle.

Limited in their speeds and interrupted by fires on the trestle, Southern Pacific's fast freights and streamliners have today pushed the old cut-off into obsolescence. Four years from now trains will roll at full speed on a stable roadbed free from the hazard of fire, accident or sabotage.

Pushing westward from Promontory Point, Southern Pacific's own forces have already bulldozed and bladed a portion of the new embankment into place. But full-scale construction work handled from rail facilities alone would be too slow. So the railroad has engaged one of the nation's biggest engineering construction firms, Morrison-Knudsen Co., Inc., of Boise, Idaho, to tackle the major work.

Veteran of monumental construction jobs in the West—and all over the world—since the days of building Hoover Dam, M-K has become a large-scale marine operator for this new undertaking. Two hydraulic dredges and eight towboats head up a varied fleet of workboats and small craft that will replace the more customary aggregation of snorting dump trucks found on dirt jobs. The dredges will chew out some 15,000,000 yards of soft lake bottom material, creating a trench as much as 30 feet deep along a line parallel to the old trestle and 1,500 feet north of it.

Ashore on Promontory Point, 600 men and their families will live in a special project city built for the job. They'll quarry earth and rock back in the hills and send it down to the lake shore by a two-mile long conveyor system. Shuttling back and forth with their barges, the towboats will move 75,000 tons a day from dockside to the job. Dumping in 30 feet of water, plus the trench depth, means that an average of 60 feet of fill height must be placed before the work "begins to show." Southern Pacific estimates 10 yards of dirt under water for every yard that is visible.

Size of this project alone makes it notable to the ordinary observer, but the technically minded man looks farther. What he sees are the differences in method between this and other earthmoving jobs. Largely, they center in the manner of handling embankment material—a unique Hewitt-Robins conveyor system on land, and the Enter-

prise-powered towboats and Kaiser-built barges afloat. The floating equipment required special design considerations, and then posed some unusual construction obstacles too. The towboats, in particular, had to be specially conceived for Salt Lake water, which outweighs ocean water by some 12½ lb. per cubic foot. Moreover, they had to be designed for building in sub-assemblies and shipment to the lake for final completion and launching. Finally, their peculiar assignment gave unusual emphasis to boat building economies on the one hand, and at the same time to dependability on the other.

Shipped in pieces from Portland, Oregon, the first 60 ft towboat hull was assembled on Marine ways specially built at Promontory Point, Utah.

Clean, functional lines and details mark the design of Enterprise diesel equipped towboats now serving on Great Salt Lake.

30



Unlike the usual work boat, these aren't supposed to see service for an indefinite period. They're a four-year item, supposed to pay for themselves in that time, and figuratively with no need for even staying afloat once trains start to roll on the new embankment! On the other hand, their performance is the key to the job, for the whole length of the job. Morrison-Knudsen is not in the position of a shipper who can turn elsewhere if one fleet of towboats is booked solid at a particular moment. M-K's "moment" will last four years and the towboats are expected to work the whole time. To solve this neat problem M-K

turned to the services of dependable professionals in every phase: L. C. Norgaard, San Francisco naval architect, for consultation on design; Gunderson Bros. Engineering Corp., of Portland, Oregon, for construction; and Enterprise Engine & Machinery Co. for diesels.

Norgaard's recommendations took shape in six spoon-nosed hulls, tunnel sterned—but a little finer aft than might be expected—and framed extra heavily against the impact of heavy weather on the lake. Salt Lake is known to whip up 7-ft waves in a good storm, and the 76-lb density of that water puts a burden on the man who designs for it. Accommodations are rudimentary, in view of the specialized duty of these vessels, and the pilot houses are unconventionally perched on an open steel framework, frankly to assure good visibility over the barge tows and nothing else. The six "big" boats—60-footers—are each powered by a pair of Enterprise model DMM-36 engines. Brown Boveri turbochargers are especially sized for engine operation at the 5,200-ft elevation on Salt Lake, with a resulting engine rating of 500 hp at 950 rpm and a bmep of 139 psi. All boats are equipped with Western Seamaster hydraulic 3:1 R & R gears on each engine.

The pair of 54-foot boats are fitted with DMM-34 engines, similarly turbocharged to achieve a rating of 290 hp at 950 rpm and a bmep of 120 psi. Gunderson Bros. took on the chore of building these craft, and then of dismantling them again! More precisely, the first 60-footer was launched into the Willamette River in September for trials, which it passed with power to spare. Then it was cut apart for shipment to Ogden, Utah, on rail flat cars, and rebuilding on ways at Promontory Point. The remaining seven towboats are being built in Portland the same way, but are being cut apart for shipment without any prior formality of launching. The cuts have been carefully conceived to minimize difficulty and number of separate sections. Experience with the first boat is typical: pilot and engine houses removed to constitute one flat car load; the hull split longitudinally into equal halves for two additional cars. Engines and machinery make up additional loads.

The statistics of SP's new mainline fill across

Great Salt Lake are pretty impressive in themselves. First, to define it, the project is 12.3 miles long, and will require placement of 31,500,000 cubic yards of earth and rock embankment. Dredging a trench through unstable lakebottom mud, and creating harbor facilities to serve the job, accounts for another 16,000,000 yards of earth-moving. The new embankment will be placed in a water depth averaging 25 feet, plus trench depths of as much as 35 feet. Bottom widths will vary from 175 to 480 feet; the top will be uniformly 34 feet wide except at a 7,800-foot long passing track near the middle.

Six 2,000-ton capacity barges will dump fill material and, aided by special devices, will be able to place earth to a height of 5 feet above the surface. Rail cars and dump trucks will work to "top off" the embankment at 17 feet. The \$46,000,000 Morrison-Knudsen prime contract will be augmented by SP's \$2,000,000 for installation of railroad track and signal equipment. In addition, SP has already placed a small amount of fill at the east end of the project, hard by Promontory Point. The resulting total \$49,000,000 price tag thus works out just short of \$4,000,000 per mile. A four-year undertaking for M-K, the project will involve 600 men and \$15,000,000 of specialized equipment, including a two-mile conveyor on shore valued at over \$1,700,000, and two hydraulic dredges, the 18-inch "John C" and the 13-inch "Skookum." Major subcontractors and suppliers to the prime contractor include Hewitt-Robins, Inc., conveyor manufacturer; Kaiser Steel Corporation, barge fabricator of Fontana and Napa, California; Chicago Bridge & Iron Company, assembling the barges at Promontory Point.

Quarried rock and earth in the borrow areas will be loaded out by eight power shovels, including six Bucyrus-Erie 150B electric shovels. Fifteen 25-ton and eleven 35-ton Euclid bottom-dump units will feed material to the conveyor system. Caterpillar tractors will maintain the borrow pit areas. For Southern Pacific, H. J. Willard is resident engineer, representing W. M. Jackle, chief engineer for the company. Morrison-Knudsen's project manager is O'Dean Anderson, with Carl Larson as general superintendent.

31

The huge fill project will parallel this present wooden trestle crossing opened in 1904.

A 60 ft towboat on trials on Great Salt Lake. Twin Enterprise 300 hp diesels equipped with Engine Life Maxiflo full flow lube filters move the boats.



NATIONAL SUPPLY TORQUE CONVERTERS

By J. W. BROWN*

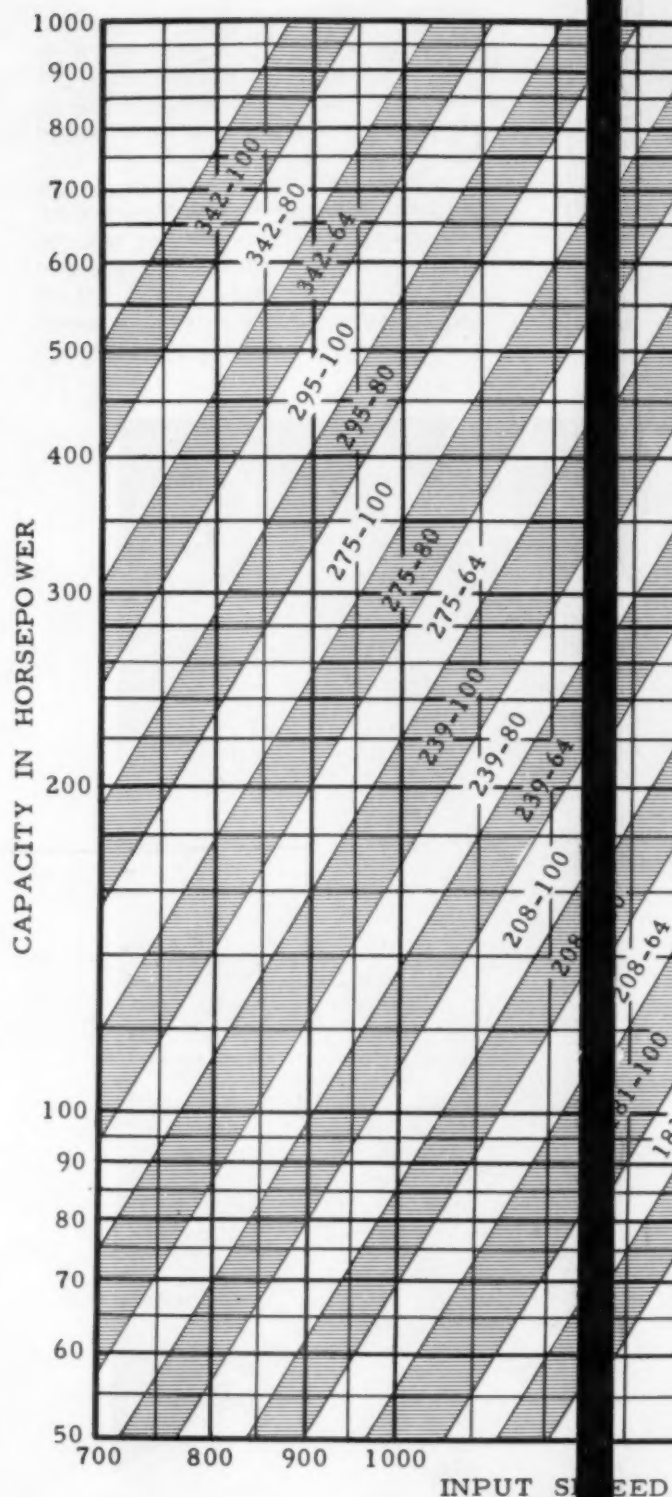
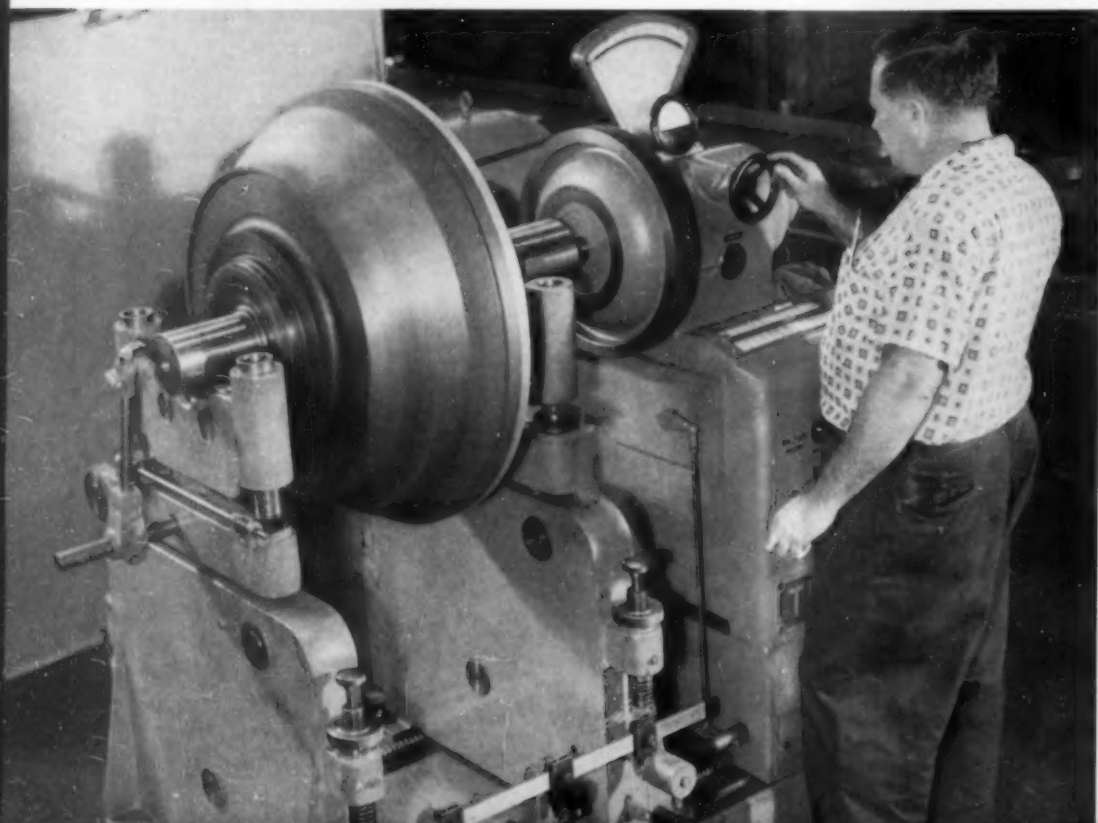
THE National Supply Company, widely known manufacturer and distributor of oil field machinery and equipment, is making a firm bid for a share of the growing demand for torque converters in the construction machinery, hoisting equipment, transportation and other industries. National-built torque converters are not new. In fact, the company has been making them for the oil well drilling industry since 1953, and early in 1956 installed a converter production line in their Toledo, Ohio plant to take care of sales to additional markets. We were privileged to look over this torque converter assembly line in the company of A. J. R. Petersen, Product Engineer, with whom we walked through the big plant noting its array of huge oil field mud pumps in various stages of assembly, its stacks of steel plate up to four or five inches in thickness, its big cranes and its complete iron foundry. We had run into National products from Kansas to the Gulf—now it was indeed interesting to see some of the machinery that made their strong place in the oil field supply industry possible.

In the office, Herb Willke, Assistant Director-Engineering of National Supply told us some of the history of their entry into torque converter manufacturing. National Supply tried out one of the first converters in the oil fields, back in the 1930's. They used quite a few of them on petroleum rigs before World War II, and had become good customers for two or three torque converter manufacturers during the boom in oil field equipment which followed the war. With this pioneer ex-

perience in oil field converters, they accumulated valuable data and ideas that helped them to initially design a unit to match particularly the medium and slow speed engines of larger horsepower output where there was a fast growing demand and need for torque converters. They also felt as they got well into the converter picture with their own units that they had a versatility of design to build converters of a wide spread to match the horsepower output of a great variety of engines. Now they have converters available in 17 power capacities in closely spaced ranges to accommodate engines and electric motors of from 100 to 1000 horsepower.

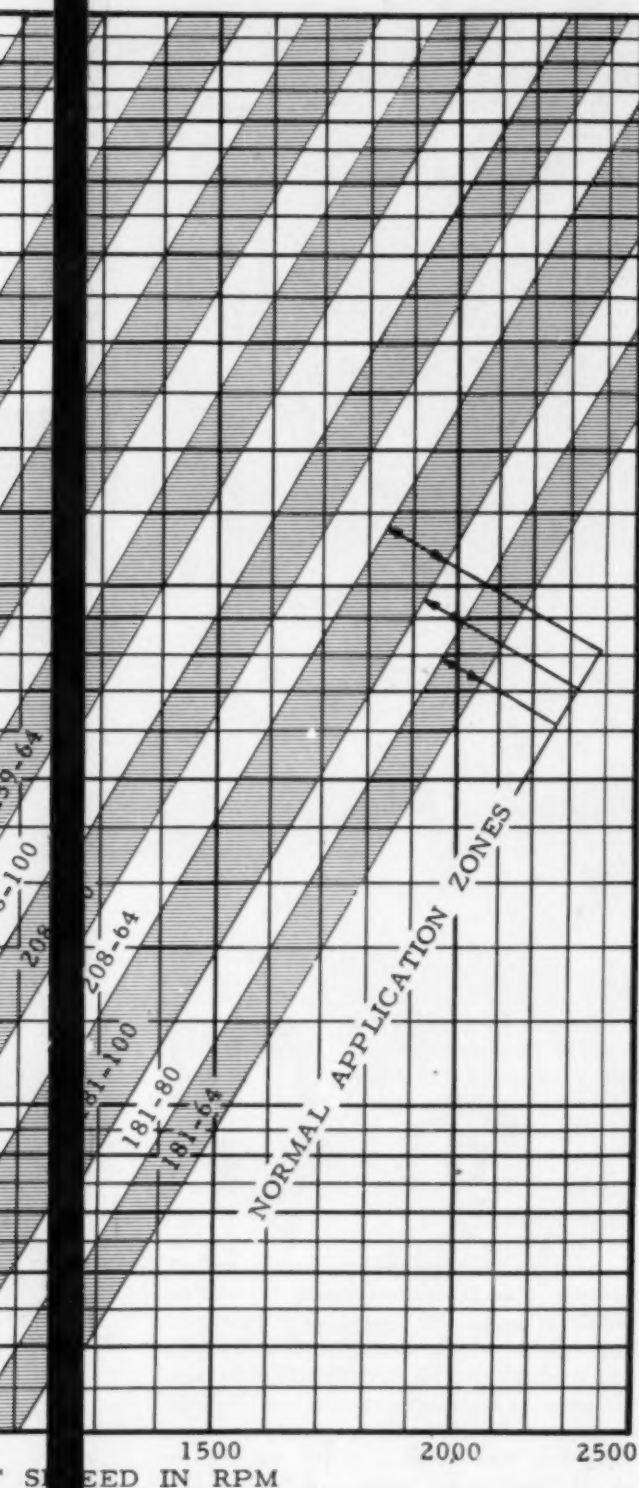
Shown herewith is a chart of the standard models and sizes of National Supply Company converters, showing horsepower capacities at various speeds. Basically there are now available six models, called the 181, 208, 239, 275, 295 and 342. These model numbers are taken from the outside diameters of the converter turbines which are 18.1, 20.8, 23.9, 27.5, 29.5, and 34.2 in., respectively. Then, by changes in the design of the circuits in pumps, turbines and stators, National Supply Company builds variations on these basic sizes in approximately 20% increments. Thus a 275-100 converter, rated for 450 maximum hp at 1000 rpm would be ideally suited for an engine of 425 hp output at that speed. An engine of 20% less hp output at 1000 rpm would fall within the range

A National Supply Company torque converter pump and drive assembly being tested for balance on a dynamic balancing machine.



of the 275-80 converter. The 80 sizes are suitable for 80% of the hp input of the 100 sizes; the 64 sizes for about 64% of the hp input of the 100 sizes. These three capacity variations are common to all but one of the basic sizes, which has only two. Added up, this gives National Torque Converter purchasers a choice of seventeen different capacity ranges in the 100 hp at 1500 rpm to 1000 hp at 900 rpm band, which covers the most popular applications. As graphically illustrated by the chart, this enables most power users to choose a National converter closely suited to the characteristics of the prime mover.

National Supply Company builds two general styles of converters: the A or open circuit type in



which the body of the overall enclosure serves as a sump for the hydraulic fluid and the B or closed circuit type wherein the fluid is carried under pressure in the manifold formed by the bell-shaped driving member on one side and the pump member on the other. In the closed circuit type two gear driven pumps, one for charging the system and one for circulating the fluid, are driven by a large ring gear fastened to a rotating member of the converter. Rotation of the converter by the engine or motor actuates the pumps. The hydraulic fluid is circulated outside of the converter for cooling by the circulating pump. The charging pump draws excess fluid from the built-in sump and maintains a pre-set pressure in the operating circuit. If other provisions for

cooling are not made, an integral cooling system in the form of a mounted radiator is furnished. For hydraulic fluid, all National converters use standard S.A.E. 10 lubricating oil.

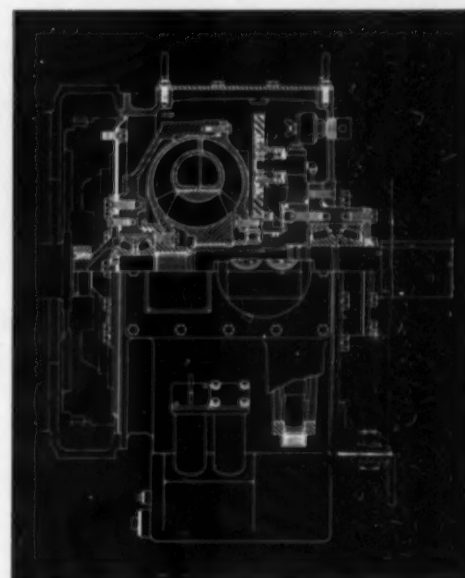
For general converter performance characteristics we will discuss the performance of a typical National torque converter, Model B-208-100. This converter, at 1600 rpm, will handle a maximum hp input of about 440 bhp. The efficiency curve peaks at .7 speed ratio (when the output shaft is turning at 70% of the speed of the input shaft or flywheel) and shows a maximum efficiency of approximately 88%. The stall torque ratio is 3 to 1, meaning that the converter will increase the engine torque up to 300%. Since all of National Supply Company's standard converters are of the same general design, these characteristics may be taken as typical of the whole series.

It should be noted also that to date National Supply Company's converter design is based entirely on stationary stators. This type of design is very effective for operation under conditions of relatively heavy and constant loads. In designing these converters, National Supply engineers also gave particular care to the design of bearings and seals. The result is a family of rugged converters designed for effective application in the extremely demanding service of oil-field equipment. Optional equipment includes input and output disconnect clutches, output shaft governor drives, and, for certain models, fluid-dumping controls which do away with the necessity for disconnect clutches in applications where the latter might ordinarily be needed.

Besides their regular line of converters, National Supply Company has the facilities to design and manufacture either single-stage or multi-stage converters to meet individual specifications that may be required, along with any other transmission system components needed.



Output shaft end of a National Supply Company B275-100F Torque Converter, designed for flange mounting to an engine flywheel housing.



National Series B-208 and B-181 Hydraulic torque converters.

View of H. E. Drummond Coal Company's Lima 2400 Power Shovel in action near Jasper, Alabama. This machine is equipped with a Cat D397 diesel driving through a National Supply Torque Converter, the end of which can be seen to the rear of the shovel.



DIESELS THRIVE IN DUST-FILLED QUARRY

By L. H. HOUCK

THE vital statistics of internal combustion engines are filled with records of engines destroyed in a single dust storm. Only a few months ago several hundred gasoline engines were ruined beyond repair in western Kansas. Yet in most crushed rock plants, the diesels live a normal span of life in a continuous dust storm. The air they must have to live is never free of lime dust in quantities that cover your glasses and obscure your camera lens and yet the punishment such engines endure is an old, old story. But the maintenance methods, especially on the preventive side, is always a new story.

One of the largest and most important rock quarry and mining operations in the country is that of the Jos. J. Griesemer, near Springfield, Mo., where 200 tons of crushed rock an hour is mined by tunnel from one of the finest beds of Burlington lime stone to be found anywhere—98 per cent calcium carbonate—more than 50 feet thick and spreading over a 40-acre site. Production ranges from lime dust for agricultural purposes through all the aggregate rock sizes, plus special filter stone for sewage disposal plants.

In the eight years since the operation was started by Jos. J. Griesemer he has played a game with conveyors, diesel engines and diesel trucks to come out a winner with one of the most efficient operations in the country. For instance, his secondary plant after the rock is dumped into the crusher has been twinned. There are two secondaries side by side and the result is that two sizes of rock can be loaded into two railroad cars at the same time. In fact, some half a dozen different products can go to as many different locations in the normal operation, such as to storage bins, to waiting trucks, to ground storage, to railroad cars. There are 15 diesel engines in normal operation.

The operation starts with drilling blast holes in a 25 by 50-ft face in the several tunnels. Air is

supplied to three Ingersoll-Rand DB-35 drifters mounted on a shop-built jumbo by a 900 cu ft Chicago Pneumatic "Power-Vane" rotary air compressor located outside the tunnel and powered with a GMC-6-110 2-cycle diesel, with automatic controls. Air goes from compressor to an inside air receiver and is maintained at 90 to 100 psi. The holes are blasted at night with each 72-charge blast bringing down some 600 cu yds of rock and advancing the tunnel 10 ft, which makes a pile 15 ft high, 50 ft wide and some 20 feet from front to back wall. Since this is all dry rock, the diesels working in the tunnel must breathe the dust-laden air exclusively.

This rock is loaded into four of Euclid end-dump trucks—two are 10-ton powered with 4-71 GMC diesels and two are FD 15-ton powered with 6-71 GMC's. Loading is done by an L-50 Lorain shovel with a Caterpillar D-318 diesel. Before loading is started the floor is "swept" by a D4 Caterpillar tractor with dozer. The Euclids haul to the mill over a steep grade for a 1500 yard trip and dump into the main crusher by way of a 30 x 14 ft scalping grizzly which feeds into a 30 by 30 in. Cedar Rapids double impeller impact breaker, which is powered by a D-17000 Caterpillar diesel. This crushed rock feeds into the two secondaries previously mentioned. Plant identification calls one secondary, the North and the other, the South. The North secondary has an 18 by 30 in. Universal roll crusher which is driven by a D-17000 Caterpillar and a 2-deck, 5 by 14 ft, Simplicity screen powered with a D-315 Caterpillar. A Cedar Rapids roll crusher is used on the South secondary powered by a D-318 Caterpillar and a 4 by 12 ft, 3-deck Simplicity screen powered with a D-311 Cat. diesel.

Ordinarily an engine or a maintenance superintendent wouldn't be concerned about which way the wind blows but here the direction of the wind makes all the difference in the world because if it's blowing dust into one of the big diesels they



may have to change and clean air filters every hour. If it's blowing away from the engine, once a day may be enough. Regular maintenance is the secret of getting long life in abrasive rock atmospheres. Truck air cleaners and oil filters may do for 10,000 miles in normal operation on the highways but here oil filters are changed at 100 or 150 hours. Extra attention is given to the amount of dirt that seems to be present. If 100 hour changes and drains do not clean, then the operation may be rescheduled for 50, or 75 hours. Ordinarily 150 hour intervals do the job. Air cleaners are cleaned every day unless the wind is blowing dirt into the engine which requires cleaning of air cleaners every hour. If, perchance the wind is blowing away from the engines, an air cleaner can be operated as long as three days. Here the main job is to watch to see that the filters do not become loaded and thereby ineffective. If the oil filters are kept clean by changing and the air cleaners are not loaded up, they will handle a certain amount of rock dust without harm to the engine.

The big GMC engine that drives the Chicago Pneumatic air compressor, is equipped with a 24-volt Willard battery for starting, a Chevron cold weather starter. The air cleaner is a Vortex and the oil filter is Fram. This equipment is also used on the GMC diesels on the four Euclid trucks. Different schedules are used, according to the amount of dust being collected. While most of the Caterpillar engines on the rock plant are direct connected, the D-318 on the Lorain is operated through a Twin Disc clutch and the D-318 on one

While the gigantic highway programs in Missouri call for top production of aggregates, agricultural lime is also an important product. This is one of the highway signs used to promote greater use of agricultural lime.





GMC dieselized Euclid climbs grade from tunnel to mill with a load of rock. Trucks are driven from face of tunnels to mill.

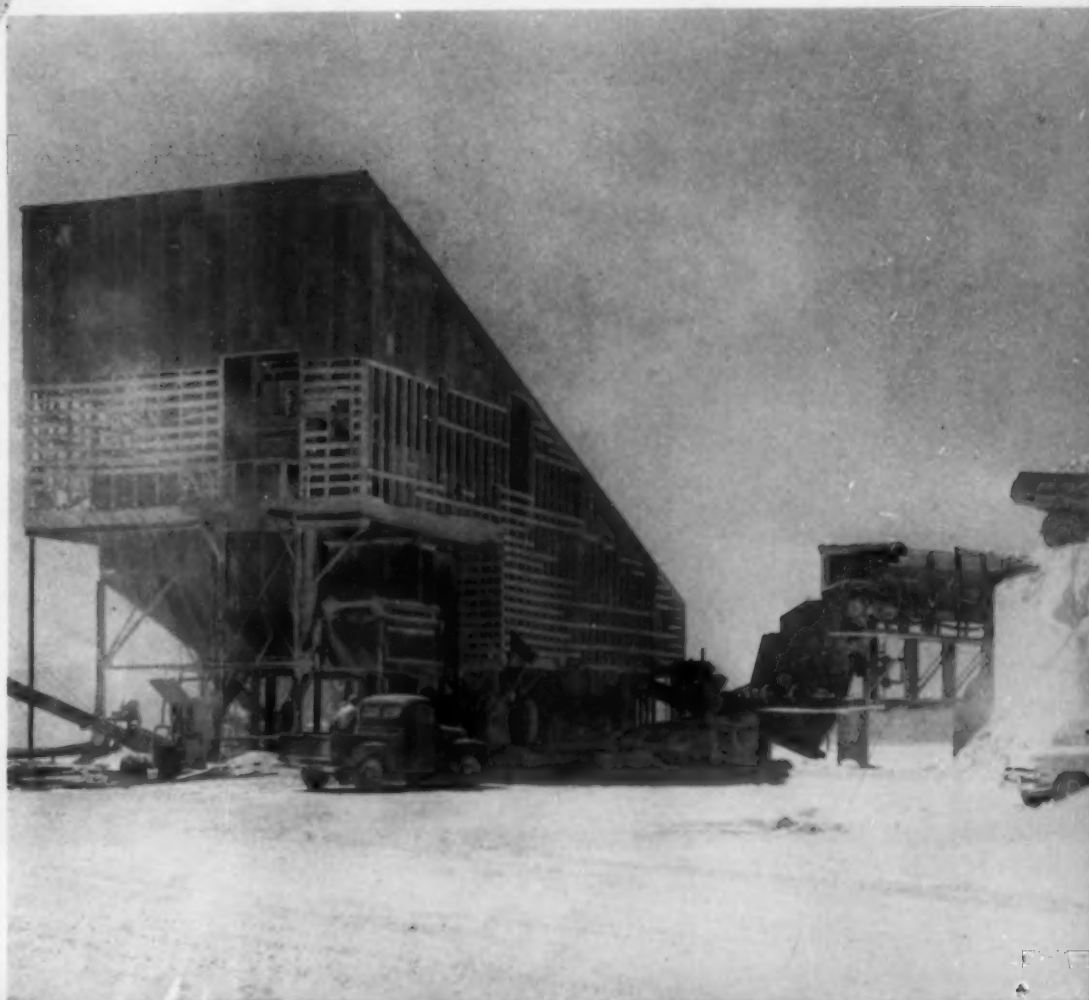


Jos. J. Griesemer, owner (left) and son, John, and Vernon Lawrence, mining superintendent, watch the rock plant operation. John is plant superintendent.

Primary is at right and two secondaries in tandem are in the structure at the left. Unique arrangement makes it possible to load two different railroad cars with two different sized stone at the same time. Caterpillar engines are in center.

of the secondaries has a reduction gear and clutch by Twin Disc.

Diesel drive for such a heavy operation is the practical answer to the power problem. Low operating cost and low upkeep cost are characteristic for such a job which is one of the toughest in the country for engines. Another feature which adds to the good record of the diesel is that the exhaust inside the tunnels in non-toxic and with large openings of 25 by 50 ft with cross cuts and 30 by 30 ft pillars, only natural ventilation is required. Jos. J. Griesemer is the owner of the Griesemer Quarry, Springfield, Mo., John Griesemer, his son, a graduate engineer and war veteran, is plant superintendent and Virgil Lawrence is mine superintendent in the operation.

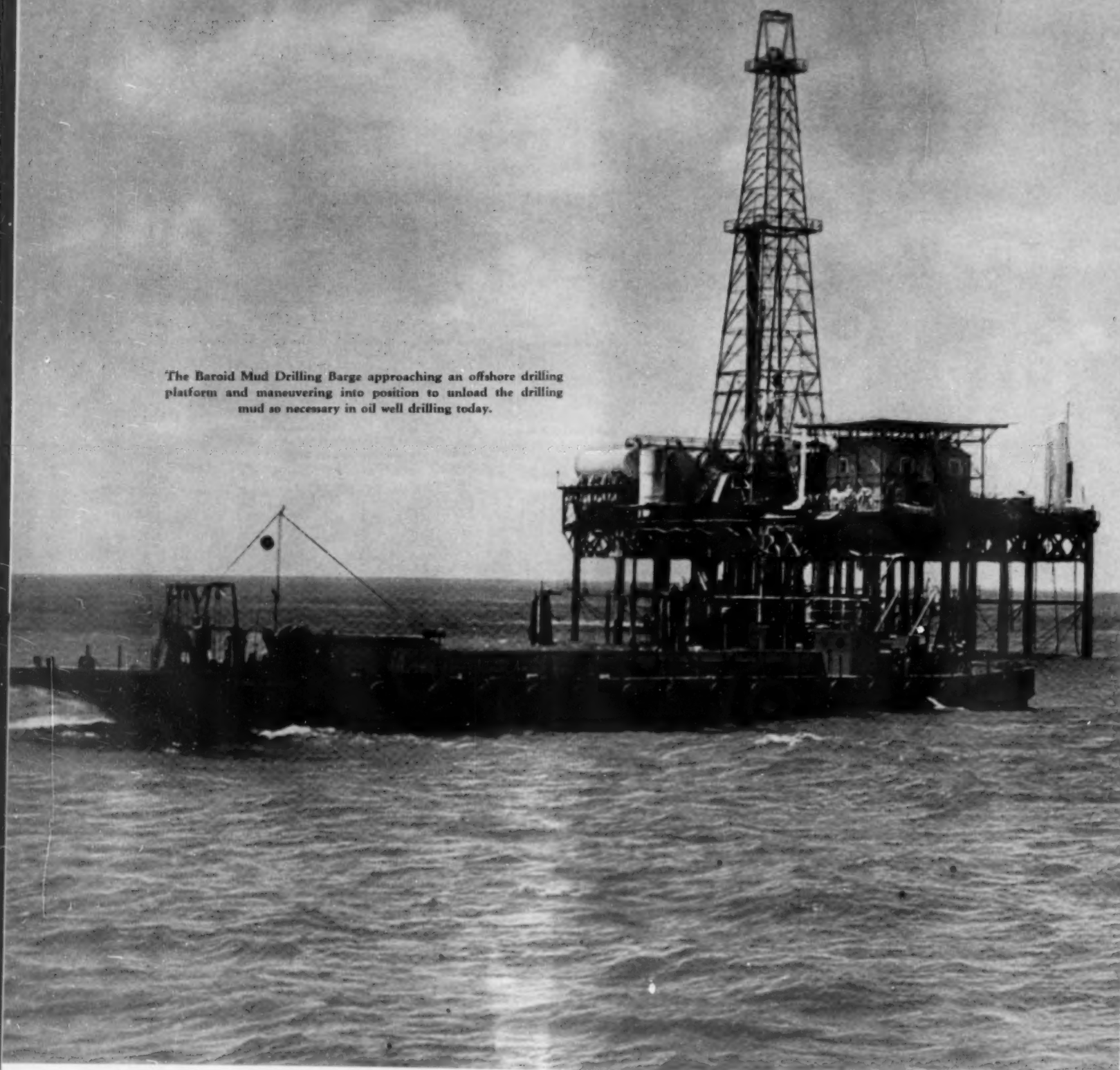


BAROID MUD DELIVERY BARGE

MR. GEORGE

By LEROY W. HUER

The Baroid Mud Drilling Barge approaching an offshore drilling platform and maneuvering into position to unload the drilling mud so necessary in oil well drilling today.



OFFSHORE Drilling in the Gulf and off the coast of California is a comparatively new development in the never-ending search for the product which makes half the world tick—oil. The oil companies, naval architects, and shipyards have developed to a high degree the offshore drilling rigs located off the shores of Louisiana, Texas, and California. It stands to reason that the companies supplying the necessary material for the efficient operation of these drilling rigs will try to improve their supply system. One of the most successful, serviceable and unique units of equipment is Baroid's new offshore mud delivery barge, the *George F. Ratcliff*, a vessel 196 ft in length, 42 ft wide, and 12 ft deep, with a capacity of 1500 tons. This payload is divided into 1000 tons of dry mud in the below-deck bins, and 500 tons in bags on deck. Power for the operation of machinery aboard is supplied by two Allis-Chalmers Buda 400 hp diesels, driving two 250 kw Fairbanks-Morse generators.

There are two features which stand out—the Kennedy Van Saun pump and automatic scale,

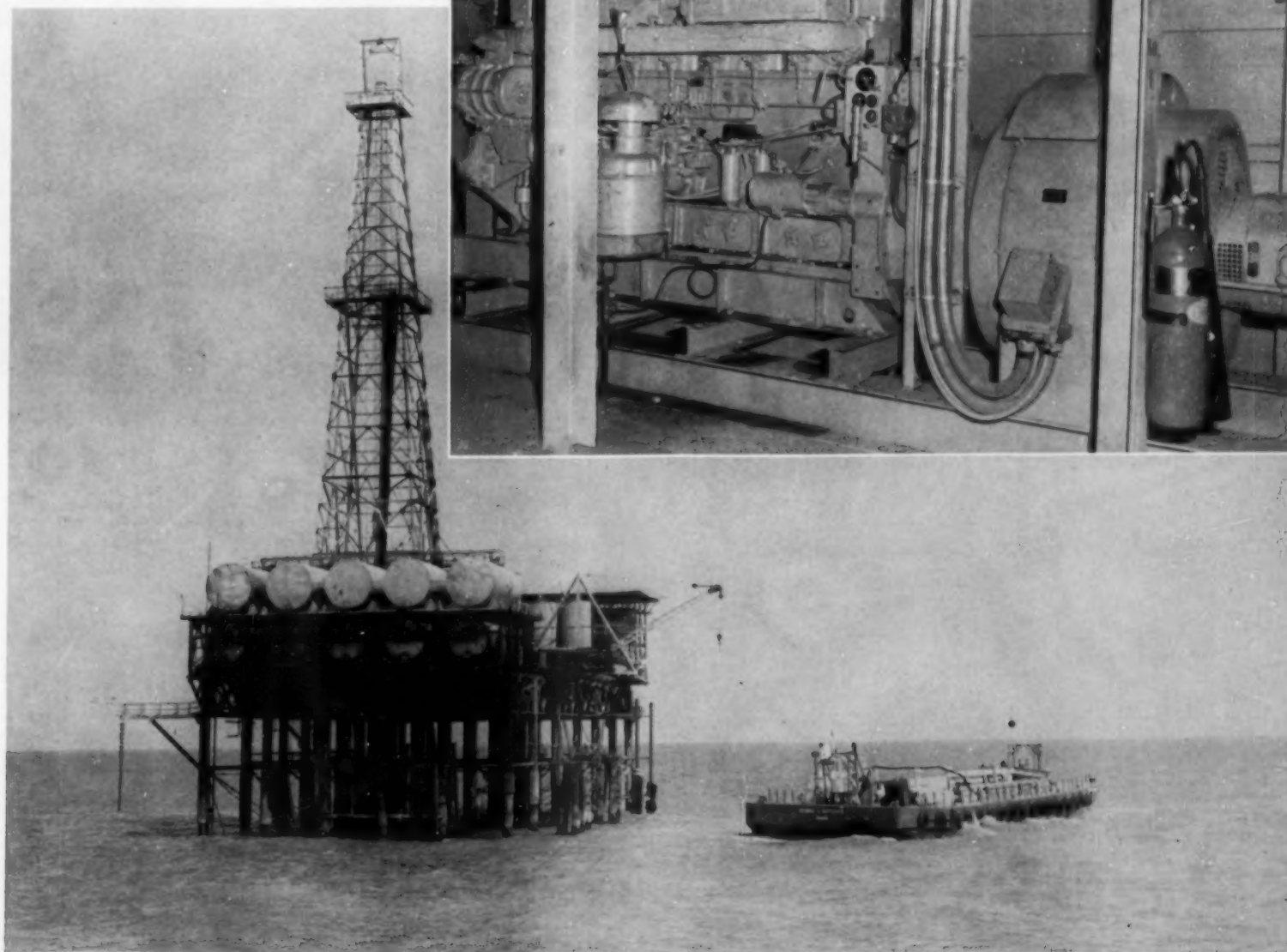
which weighs the bulk mud in 2500 lb batches as it pumps or blows the mud into the bulk storage tanks on the offshore drilling rigs; the other, the Harbormaster propulsion and steering units built by Murray & Tregurtha, Quincy, Mass. These units, diesel electric driven, are mounted through wells in the bow and stern rakes. When nearing the drilling rig, these propulsion units are used to approach and maneuver the barge into position and then, through their multi-speed controls and 360° propeller thrust steering, hold the barge in position while the mud is pumped aboard the rig through a 4 in. rubber hose. The mud in bulk form is exceedingly fine and powdery and is floated through the hose into the drilling rig tanks on a jet of air. While this operation is taking place, the two Murray & Tregurtha Harbormasters with their 360° propeller thrust steering hold the barge at a safe distance from the drilling

rig and yet close enough to allow the bulk mud to be pumped into the drill rigs' tanks.

With the absolute control of the barge by the propulsion units, there is no danger of crashing into the rigs caissons in a heavy swell. With their ability to maneuver the barge in any direction or to hold it stationary regardless of the wind or tide, chances of accidents have been eliminated, and the prompt delivery of its product is assured, making the *Mr. George* the last word in safety and efficiency. The hull of the *Mr. George* was designed by Ole P. Erickson, Naval Architect of Tampa, Florida. The idea of the mud delivery barge was conceived by Baroid personnel. Its design and construction was in the very capable hands of Chief Engineer D. R. H. Mahoney and Project Engineer K. L. Mikesell. The barge was built by the Port Houston Iron Works and is under the command of Captain D. A. Smith.

Power for the operation of all the machinery aboard this unique service barge is supplied by a pair of Allis-Chalmers Buda 400 hp diesels each driving a 250 kw Fairbanks-Morse generator.

The *George F. Ratcliffe* Mud Drilling Barge pulling away after servicing an offshore drilling operation.



THE WAUKESHA ENGINATOR

By ARNOLD B. NEWELL

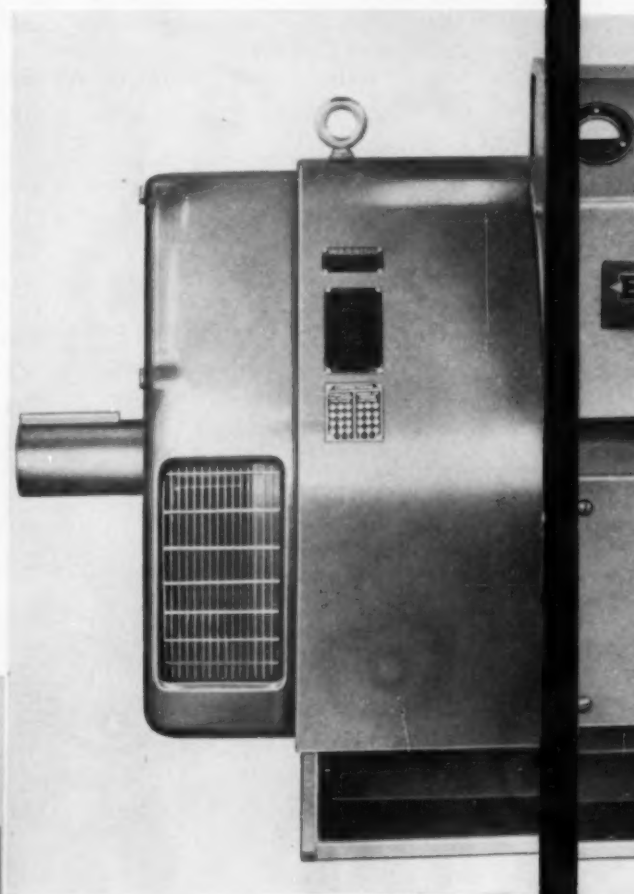
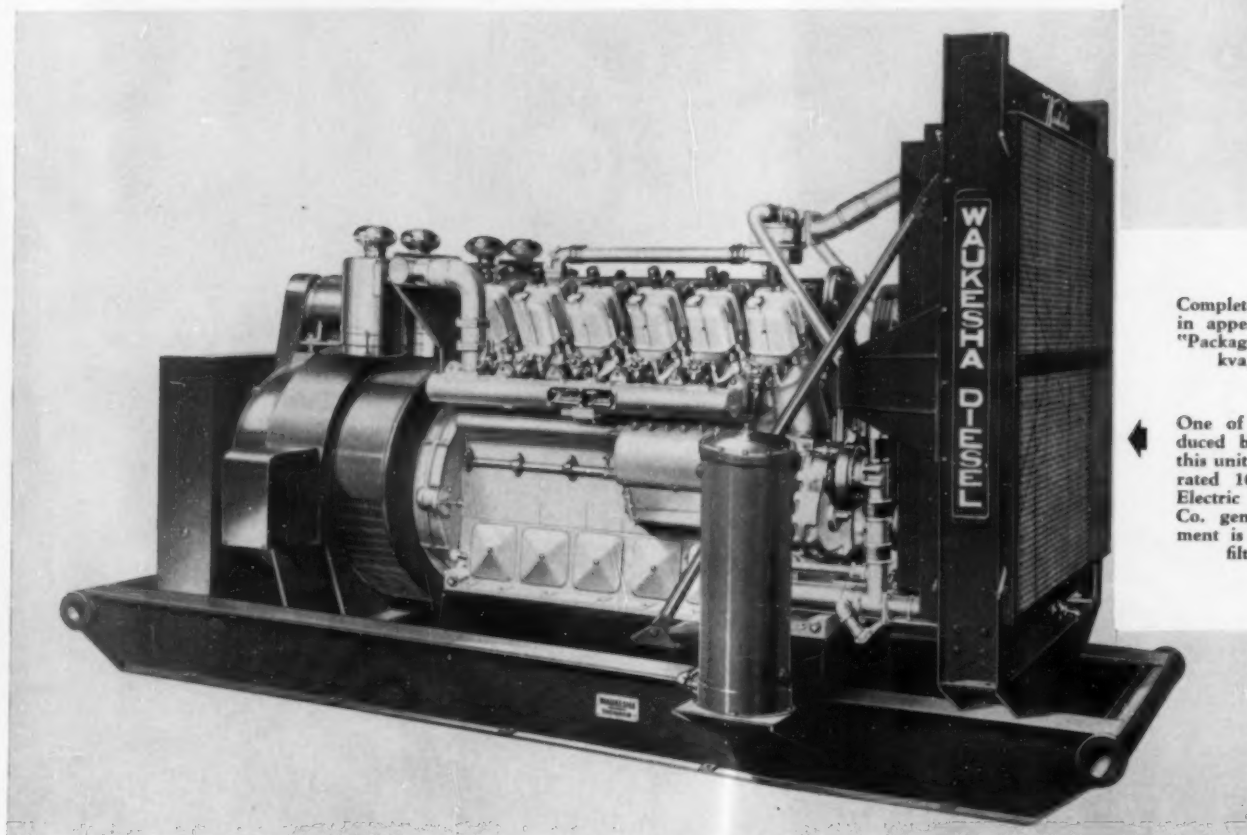
WAUKESHA, Wisconsin—Several interesting developments have taken place here at the big plant of the Waukesha Motor Company where diesel production has been overtaking that of gasoline motors over a long period of time. Going thru this plant as our Editor, Rex W. Wadman, and the writer did very recently one is impressed by the constant introduction of larger and more powerful supercharged diesels, especially of V type. The VLRDBU V-12 series with a hp rating up to 867 bhp at 1200 rpm burns LP gas and the similar turbocharged diesel of 8½ in. bore and 8½ in. stroke is rated 1091 hp at 1200 rpm as a complete power unit with all standard accessories including water pump, intake and exhaust manifold, radiator, fan and belt and air cleaner. At the lower end of the power range we find Model 180-DLCU with a power rating ranging from 12 hp at 800 rpm to 34 hp at 2200 rpm as a complete 4-cylinder power unit including all accessories. This engine has a bore and stroke of 3½ x 3¾ in. and the displacement is 144 cu in. In between these two extremes there is a complete range of models and power ratings.

What we went to see on the inspection tour was the Enginator which is a complete skid mounted electric generator set made up in a range of electrical output ratings from 50 to 600 kw driven by engines burning natural and LP gas, gasoline and diesel fuels. The two principal units are the engine and the direct connected Electric Machinery Mfg. Co. AMP-PAK "Packaged" generators used on Enginators up thru 150 kw only, of

which more later. As the generator is compact and since it is directly connected to the engine the overall dimensions of the complete unit are small. For example, the model VLRDBU diesel driving a continuous rating generator delivers 615 kw at 1200 rpm within extreme dimensions from end to end of the skids of only 22 ft while the height from the bottom of the skids to the top of the radiator is 10 ft 7½ in. Taking a typical example of a smaller size, the 100 kw diesel driven unit is 10 ft 10½ in. from end to end of the skids, 5 ft 9½ in. from bottom of skids to top of radiator and the overall width is 3 ft 4½ in.

It seems hardly necessary to enter into a lengthy detailed description of Waukesha engines because they are well-known throughout the field of diesel applications. They are all of 4-cycle design in naturally aspirated and turbocharged models. They are universally of en-bloc construction with valves in the head and pushrod mechanism operated from camshaft at the side of the engine. Pistons are of aluminum alloy with a cooling chamber beneath the crown supplied by an oil jet from the pressure lubricating system. Cylinder liners are removable wet or dry type depending on models. Crankshafts are made of drop forgings, either standard or counterbalanced with hardened main and crankpin journals running in precision bearings which are steel backed copper lead. Cylinder heads on the small engines are one piece, on the intermediate sizes they are two interchangeable pieces and on the larger models individual castings are used for each cylinder.

A distinctive feature of the Waukesha diesel is the combustion chamber consisting of a two-piece insert installed from the outside of the engine with a spherical shaped interior connected to the cylinder space by a throat tangentially placed. This is a steelite precision casting air insulated from the cylinder head to prevent heat dissipation. However the upper section carrying the fuel injector is water cooled. The heated lower surface of the sphere augments compression heat and tends to stabilize ignition lag, give clean burning characteristics and smooth operation. The throat delivers the products of combustion into a pair of swirl cups in the piston crown so that the turbulence rate and the burning conforms to engine



Complete in all details and clean cut in appearance, this E-M AMP-PAK "Package" generator is rated 125 kva, 480 volts at 1800 rpm.

One of the larger Enginators produced by Waukesha. The diesel in this unit is the V-12 Model VLRDBU rated 1091 hp at 1800 rpm. The Electric Machinery Manufacturing Co. generator and exciter arrangement is conventional. Note Winslow filter in right foreground.

speed and load. This combustion system has worked out very well in service over a broad speed range. Generally speaking, it is safe to say that the Waukesha engines are of conventional design and follow conservative engineering practices throughout. There is a distinct family relationship between the diesels and the gas or gasoline burning engines which in the larger sizes are fundamentally the diesel altered to run as spark ignition engines. They can therefore operate on natural gas, gasoline, LP gas or diesel fuel.

With regard to the Enginator, it should be noted that the purchaser frequently specifies both the generator capacity and the power rating of the

engine and this tends to make part of the assembly custom built. As a matter of fact, in some instances the departure from standard practice in matching the two units is surprisingly broad. Generator capacity capable of imposing undue overload cannot be tolerated, but if a customer insists upon buying more engine than seems warranted he may do so.

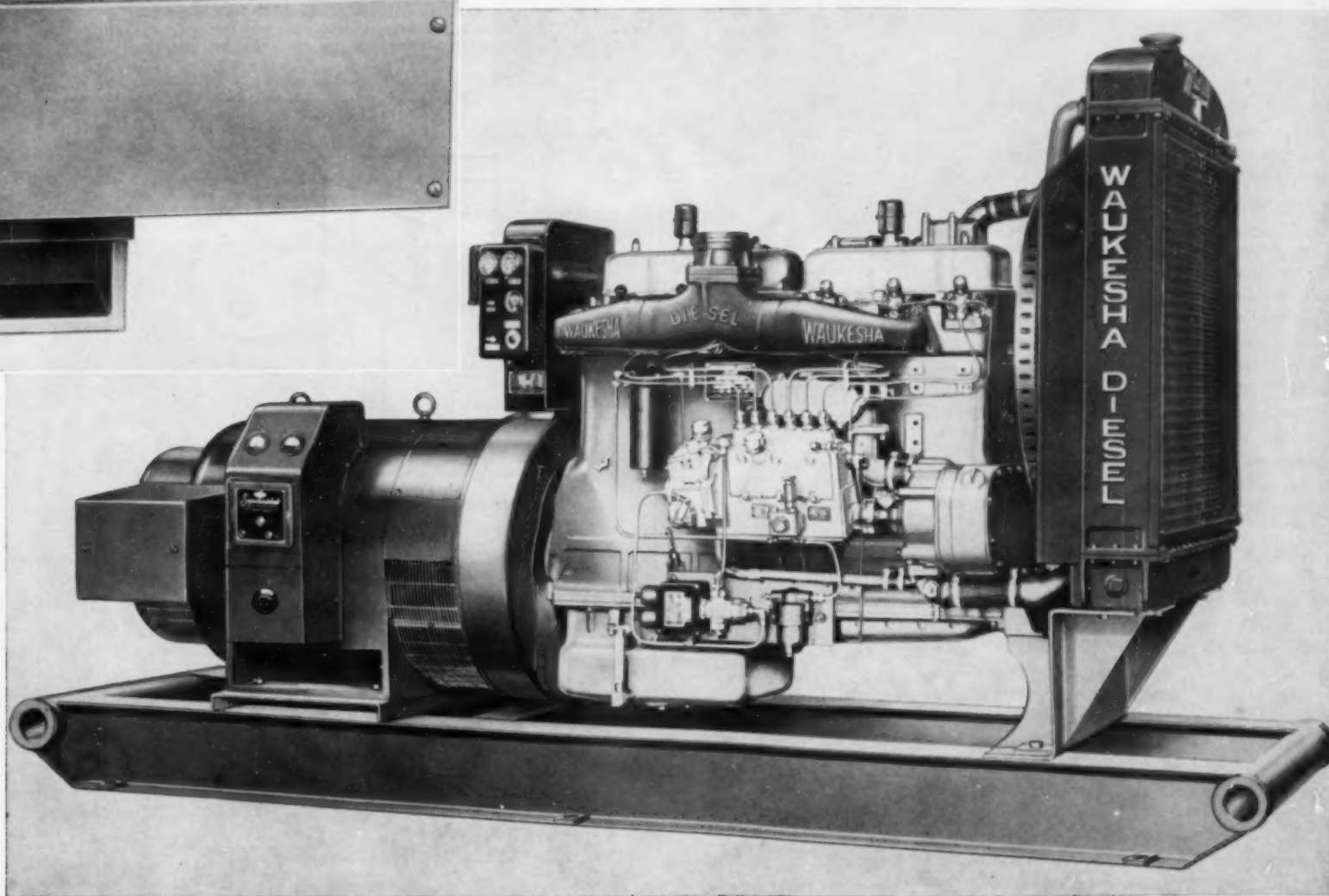
Up to 150 kw the Electric Machinery Mfg. Company's AMP-PAK "Packaged" generator is used. It is an intensely interesting generator deserving special mention. In the larger sizes, the conventional ac generator and separate exciter are used and this arrangement does not in my opinion, need to be described.

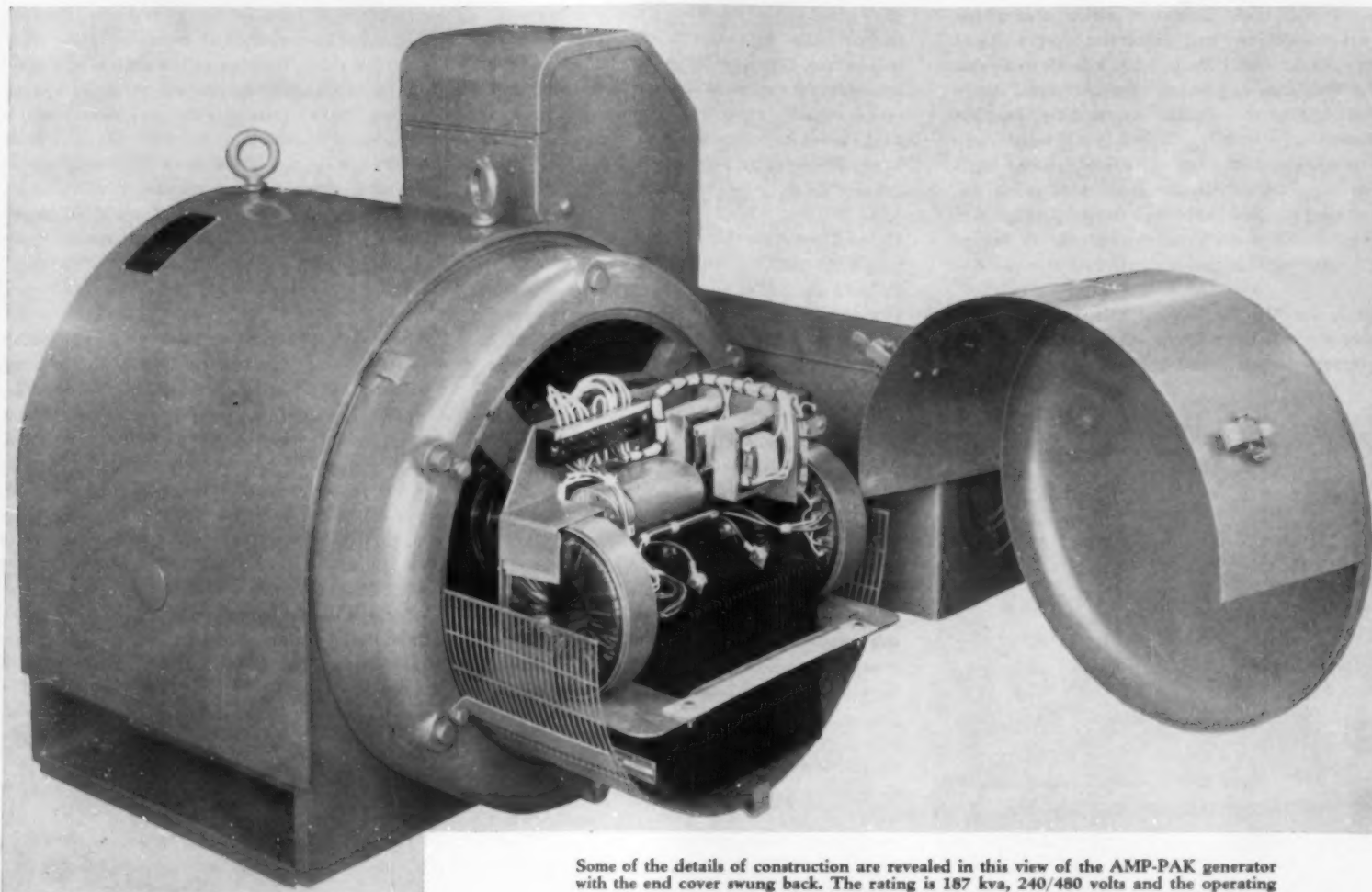
The AMP-PAK is a new development having no moving parts in the exciter and the voltage regulator. It is a compact ac generator with ratings from 75 thru 187 kva at 1800 rpm and 62½ thru 187 kva at 1200 rpm. It is a 3-phase, 80% pf, 60-cycles, 50° C rise: 120/208, 240 and 480 volt generator. It is a compact unit with built-in static voltage regulator, static magnetic amplifier-rectifier excitation system, and basic metering and controls conveniently arranged on the side. Perhaps the most interesting element is the excitation

system which replaces the conventional exciter belt driven or carried on an extension of the main generator shaft. To come to the method of excitation it is necessary to proceed thru the voltage sensing circuit which provides continuous and instantaneous comparison between the generator output voltage and the built-in reference voltage. Any discrepancy between the two is immediately signaled to the magnetic amplifier and corrected. The excitation regulator unit, with all static components is within a drip proof housing in direct path of the generator ventilating air.

The magnetic amplifier-rectifier excitation system together with the voltage booster transformer supplies ac power to the power rectifier. The power rectifier, in turn, converts ac to dc and energizes the generator field windings in accordance with the generator output voltage requirements as established by the voltage sensing circuit. Since the fields are dead until energized by an excitation circuit and since the rectifier takes its current from the generator an external source of dc current is needed to start generating current. The essential "priming" shot of dc current comes from the engine's starting battery through a voltage build-up switch. Once the momentary shot is given the generator becomes self exciting. The

The Enginator shown here is Model 148-DKBU employing the direct connected Electric Machinery generator



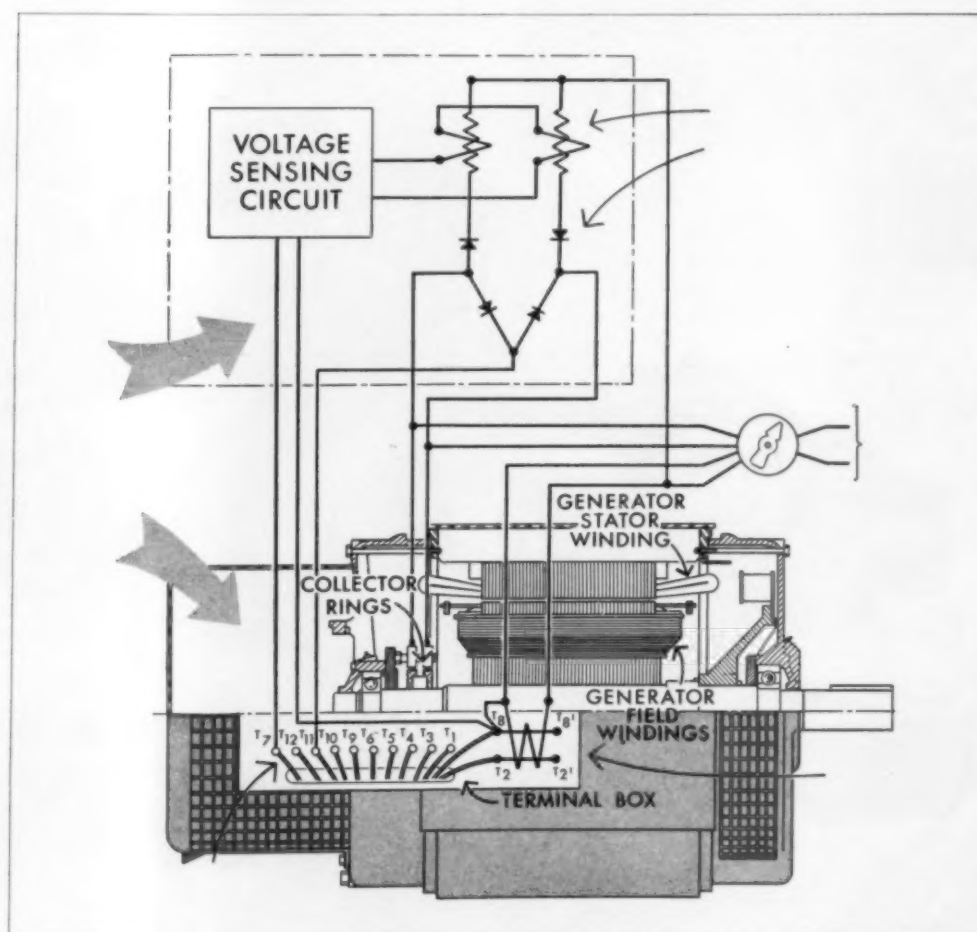


Some of the details of construction are revealed in this view of the AMP-PAK generator with the end cover swung back. The rating is 187 kva, 240/480 volts and the operating speed is 1200 rpm. Line drawing hereunder further demarks the principal features.

voltage booster transformer has the dual function of excitation and voltage regulation. This transformer supplies part of the excitation power and introduces field forcing for improved voltage regulation under increased load.

Convenience of such an arrangement is obvious to any one accustomed to looking after brushes, commutator and exciter drives of the conventional type. Undoubtedly the most fascinating feature of this particular engine-generator combination is the elimination of the switchboard. It can be hooked up to any circuit and it can be set to supply current automatically at the desired voltage including line voltage control. It will stay put automatically. There is a volt meter and an ammeter in plain sight on the housing and that is the complete instrumentation.

The engine and generator assemblies on the skids are in all instances good substantial jobs of careful workmanship. The accessory equipment including American Bosch fuel injection system, Winslow oil filters, Vortex air cleaners and the cooling system for water which may be radiator or heat exchanger has all been carefully picked and correctly engineered into the unit as a whole. This applies equally to the switch gear for the larger units, mounted with the engine and generator on the skids. A point of considerable importance is the fact that the generating unit, small or large has the essential rigidity to maintain correct alignment throughout the shaft line and is therefore independent of foundation support.



PRE-CLEANER FOR DIESELS

THE following is a case history application of the new Dollinger dry-type pre-cleaner for engine intake air. Bulldozers working the Schmidt Construction Company job 200 miles west of Denver off U. S. Highway 50, near Rifle, Colo., were in trouble. Hour after hour, powdered dust swirled up and around the diesel tractors as they shoved masses of near moistureless dirt from the construction site. The dust load was so heavy that even cleaning their oil bath filters on the intakes to the diesel tractors twice a day was not enough to prevent migration of dust through the filtering media. One engine was taken down and oily mud was found on the blower screen. A great deal of wear existed on both rings and liners.

Art Stiles, Dollinger representative in Denver, came up with the idea of installing the new Dollinger OTR pre-cleaner with dry type media ahead of the oil bath air cleaners in the tractors of Schmidt Construction Co. These air cleaners were placed on the dozers for a 30 day trial. Before the trial time was up, the test filters as well as additional filters were purchased due to these facts: 1.—No further difficulties were encountered with the en-

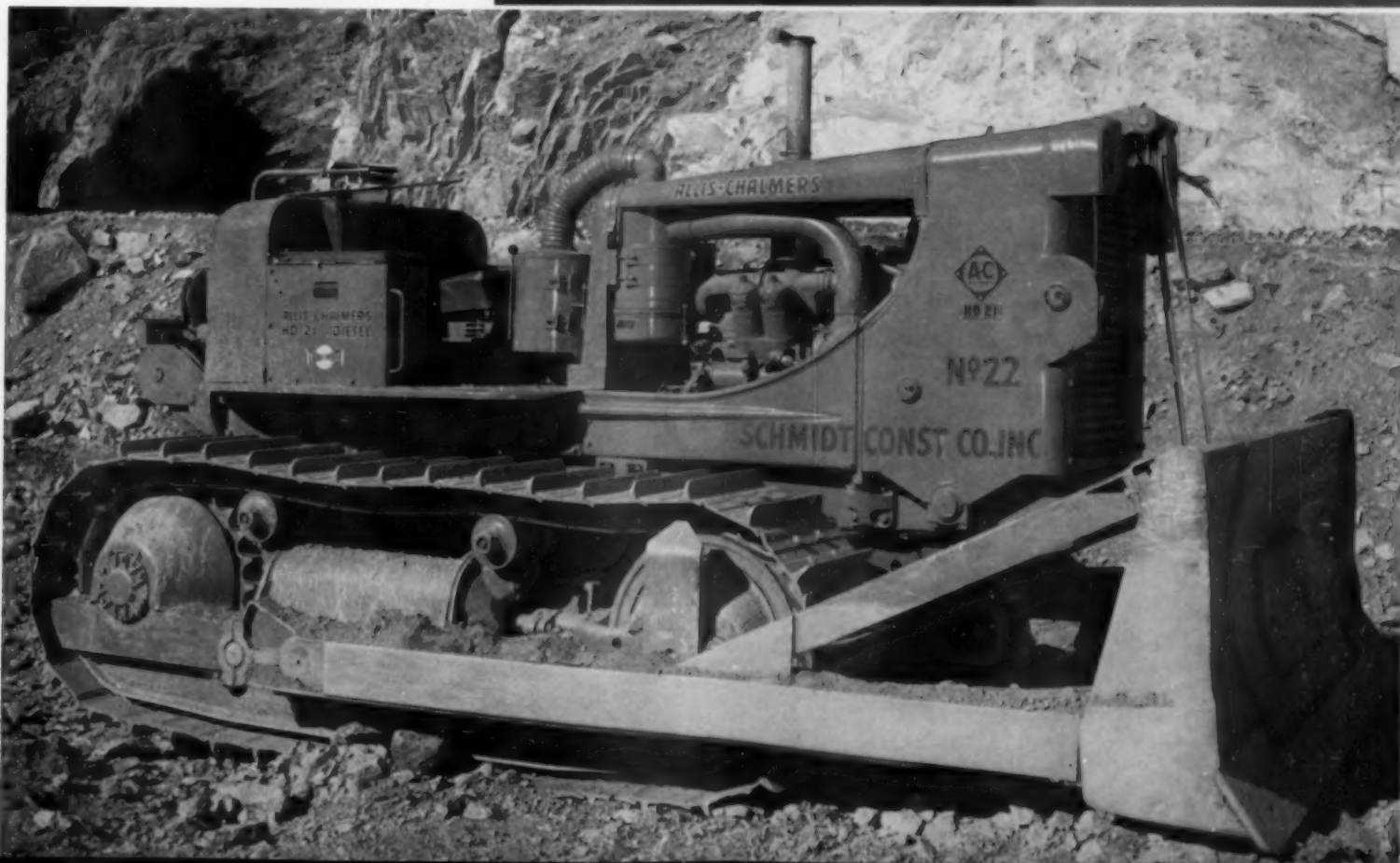
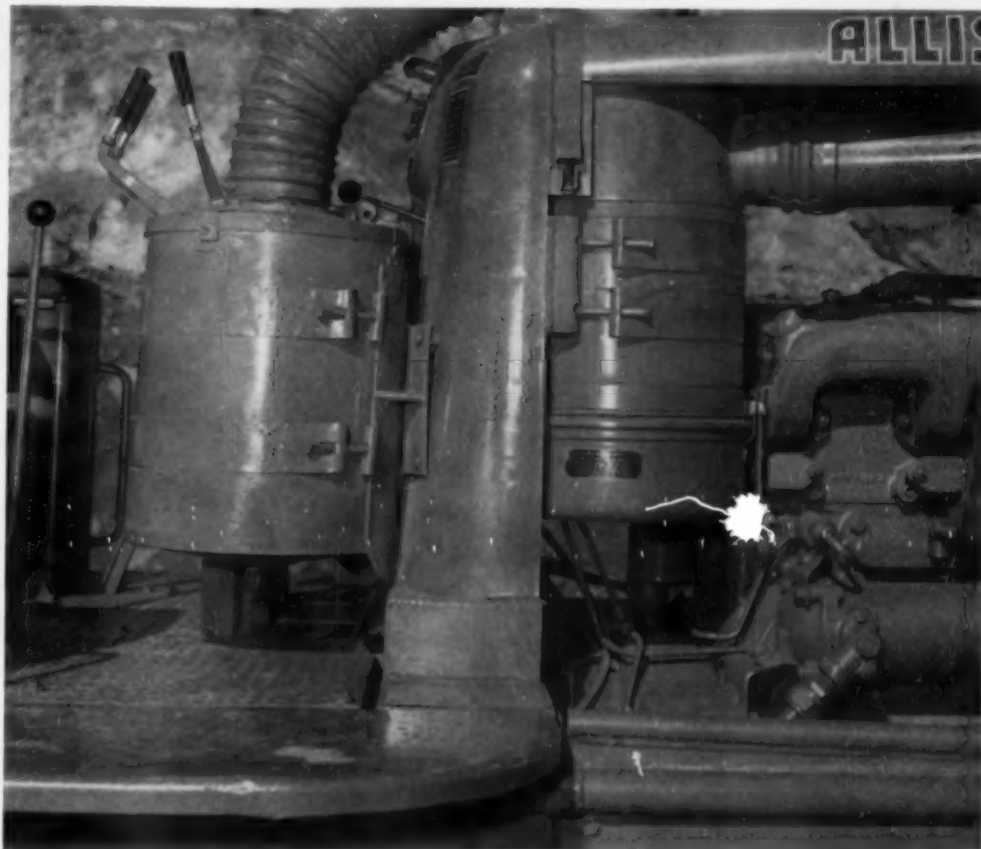
gines due to dust. However, two engines were disassembled for other reasons, and were reported to be the cleanest and to show the least wear for time in service of any the repair shop had ever worked on. 2.—Crankcase oil remained much clearer than before. 3.—As the Dollinger media can be blown off with air in most cases, servicing was quite readily accomplished. 4.—There was an immediate saving of oil used in oil bath filters, which were now serviced only after two weeks' operation, at

which time only a few ounces of very fine mud were found in the oil reservoir.

This is an interesting application because it shows how an adverse operating condition can be overcome efficiently and effectively by the installing of additional air filtering equipment. This Dollinger pre-cleaner has a very low resistance and has the cleaning capacity to match well with the existing oil bath air cleaner installed in the tractor.

The Dollinger pre-cleaner installation on one of the Schmidt Construction Company's Allis-Chalmers HD-21 tractors is seen clearly in these two illustrations. In the closeup at right, the Dollinger pre-cleaner is at the left and the regular oil bath air cleaner is next to it under the hood. The Pre-cleaner fits well on the tractor and takes up very little space, being installed in the front corner of the tractor cab.

41



SMALL, VERSATILE DIESEL COMPRESSOR

CERLIST Diesel, Inc., Burlington, North Carolina, has been granted an exclusive franchise for distribution in the United States and its possessions of one of the most modern and efficient air compressors available today. The company was incorporated in North Carolina last March and is currently working on the production designs for a new high-speed, lightweight, 2-cycle, automotive-type diesel engine in sizes from 50 to 250 hp. Designated as the JW-78, the diesel driven unit is the result of 40 years of design experience and development. It is rated at 78 cfm, 100 psig, and is available as a portable model with two rubber-tired wheels and drawbar, or a stationary model for mounting on a truck bed or other foundation.

Simplicity of design and rugged construction are outstanding features that contribute to smooth operation, low maintenance cost and long life. The horizontal, single cylinder diesel engine, built at a right angle to the single compressor cylinder in a

common crankcase and with a single, forged steel crankshaft is a unique design feature. The simplicity thus achieved contributes to low operating cost and a minimum of down-time for repairs and servicing. The cylinder arrangement balances the rotating forces and practically eliminates vibration.

The diesel engine is 4-stroke cycle, with a bore of 4.92 in. by 5.71 in. stroke and a 21:1 compression ratio, to develop 20 hp at 1500 rpm. An easily accessible and positive locking governor setting lever allows a speed selection of 800, 1200 or 1500 rpm. Since the engine operates at constant speed but varying fuel consumption as demanded by load requirements, good inherent operating economy results, to be added to the further fuel saving possible by coordinating the engine speed with the use-demand for compressed air. Great stress must be placed on these practical advantages: large bearing area of the aircraft-type connecting rod for the engine and the link rod to the compressor piston;

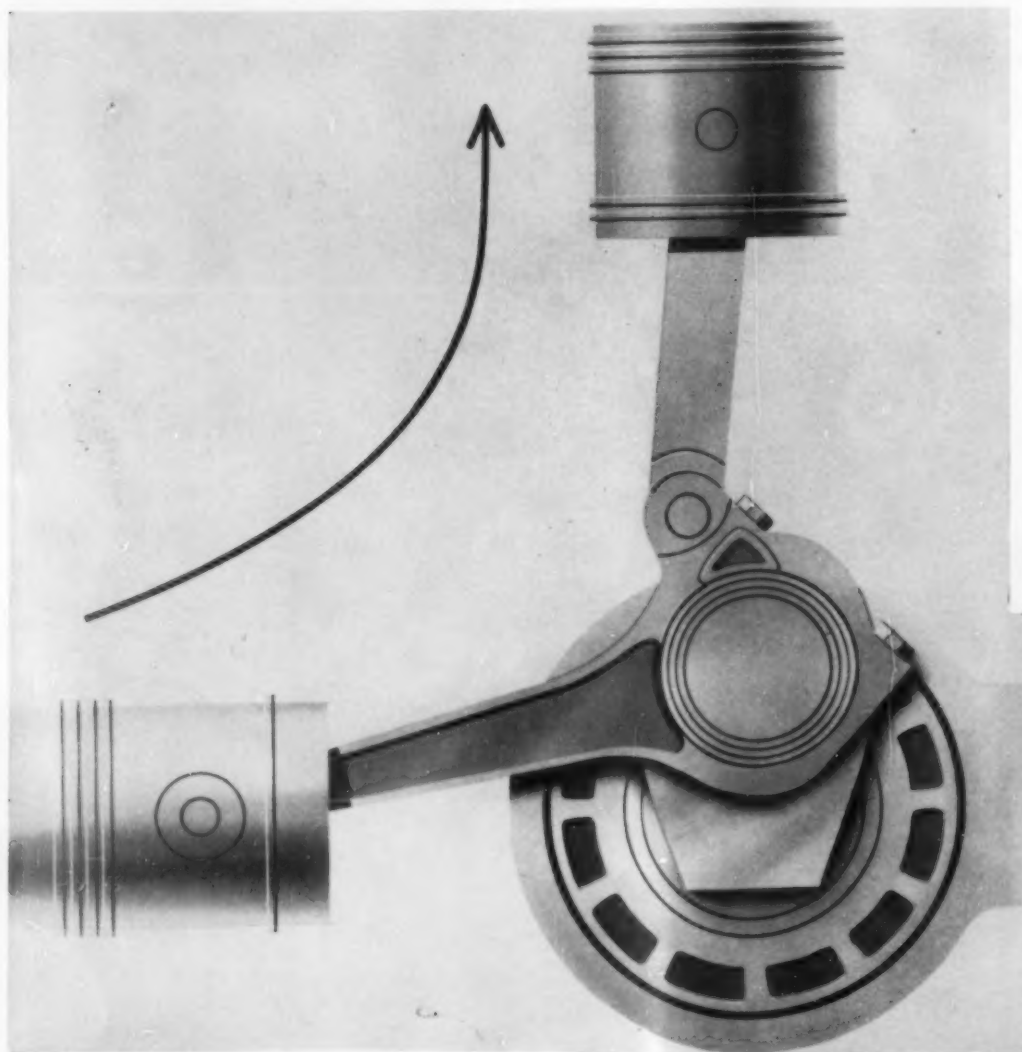
large roller type main bearings; wear resistant cylinder liners; high precision, high quality fuel injection system; single-cam operation of engine valves and fuel pump; and the high efficiency cooling system and pressure lubrication system, both of which are common to the engine and compressor components. The diesel consumes approximately \$0.04 worth of fuel per 1000 cu ft of compressed air delivered, according to the manufacturer.

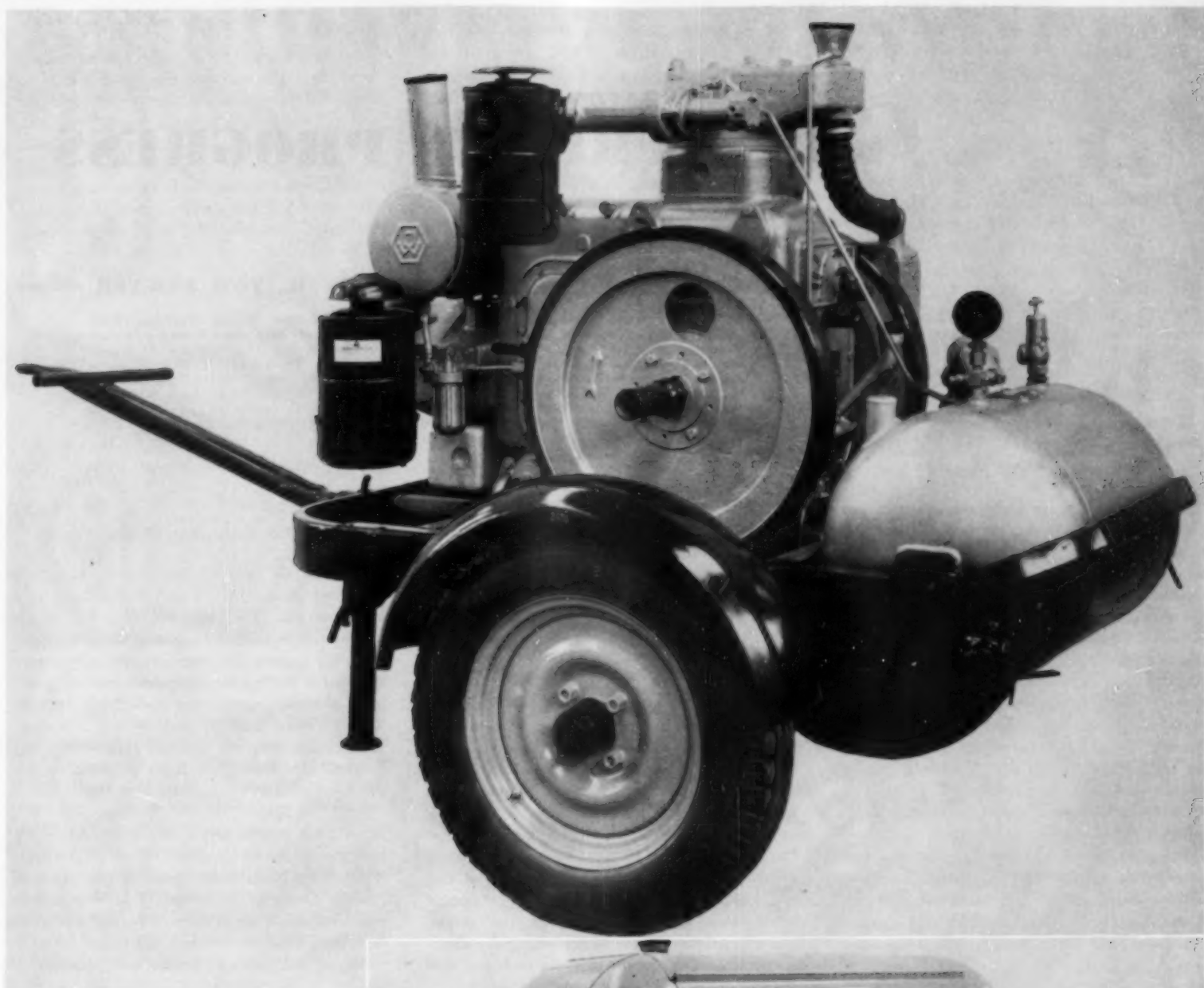
The compressor has a 5.31 in. bore and 5.51 in. stroke. The air valve is a high-speed multiple disc type of simple, trouble-free design and is water-jacketed for cooling to a temperature low enough to prevent the accumulation of fouling deposits. Air pressure in the receiver is closely controlled between 95 and 100 psig by a simple regulator containing only one moving part. Discharge air is cooled by high volume discharge from the radiator fan across the multiple tube pressure lines to the air receiver. The receiver has a capacity of approximately 4 cu ft and is fitted with two 3/4 in. discharge outlets, one at either end. Plug valve, pressure gauge, safety and drain valves are standard. The compressor can be started by hand cranking but is, nevertheless, equipped with electric starter, generator and battery. Glow plugs further assure fast cold weather starting.

The portable model is protected by a streamlined sheet metal enclosure with full panel openings on either side and at the back, for working accessibility. The entire enclosure is quickly removable by loosening only four screws. Stationary models can be obtained either with or without the enclosure. Both versatility and flexibility can readily be achieved by connecting two or more compressors in parallel to a header or in series by connecting the air receiver with a short length of air hose. No special controls are required because of the JW pressure regulating system. Capacities of 156, 234, or 312 cfm can thus be achieved economically without losing the advantages of fitting the compressor to the size of the job.

◀ Balanced forces provide smooth operation in this cylinder arrangement with the horizontal single cylinder diesel engine built at right angle to the single compressor cylinder.

Two JW-78 diesel compressors connected in series for higher capacity illustrate the versatility and flexibility of these units. ▶





The JW-78P diesel compressor with enclosure removed for complete accessibility. This unit is rated at 78 cfm, 100 psig. ➡

JW-78P diesel compressor fully enclosed for protection. ➡



FEBRUARY 1957



GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

Report on ASME Meeting

There were many interesting papers at the annual American Society of Mechanical Engineers meeting in New York. Every paper on diesel engines pointed out that by using a gas turbine in some combination with an engine a more economical and also more powerful engine could be obtained. Mr. P. J. Louzecky showed this was also true on a General Motors diesel. A new engine could be obtained by Prof. S. L. Soo of Princeton University and Mr. R. P. Ramsey of The Cooper-Bessemer Corporation which showed that this company has a unit which can replace the much talked 2 cycle free piston engine in most installations. This new engine would be similar to their standard diesel or spark ignition 4 cycle engine, the exhaust gases of which are used to run a high and low stage gas turbine which drives the load. As an unusually low fuel consumption is not claimed for the engine, it seems as if the main objective is to bring out an engine in the shortest time possible which will compete with the 2 cycle free piston engine and use many of the parts of their existing engines. I'm sure we will hear much more of this engine turbine combination in the future.

Also at the ASME meeting it was pointed out by Dr. J. J. McMullen that the *John Sergeant* gas turbine Liberty ship, with General Electric unit rated 6000 hp, made its first crossing to Europe and back. The top speed of 17 knots was generally held which equalled many passenger ship runs. An overall fuel

consumption of approximately .53 lbs per bhp-hr. was obtained. Diesel oil was used on the first round trip while heavy fuel oil, cleaned on board, will be used hereafter. In Washington on December 4th Dr. McMullen also pointed out that the trend for tankers and cargo ships is to make them both larger and faster. He predicted the largest size would be nuclear powered and many of these would be propelled by the highly efficient closed cycle gas turbine.

Messrs. Carlson and Ridland of Solar Aircraft Company together with Mr. Blackwood of the Bureau of Ships presented the facts pertaining to the 40 ft navy personnel boat stating that to equal the performance of the 500 hp turbine on board it would require 675 diesel hp due to the extra weight of the diesels. Also it was stated that the fuel consumption of the boat was only 40% more than if powered with the above diesels and this additional 40% was justified due to the overall performance gained by the excellent weight power ratio. As pointed out the weight power ratio could be much further improved if the boat was specifically designed for this turbine.

Mr. Bruce Gunnell, Consultant, presented a realistic paper on the atomic locomotive while Mr. W. M. Keller, Director of Research of the Association of American Railroads said "I expect to see the atomic locomotive sooner than most of us realize". In my discussion I showed a rough sketch which looked like to-day's large roadswitcher unit. All three of us agreed that the power unit would be a

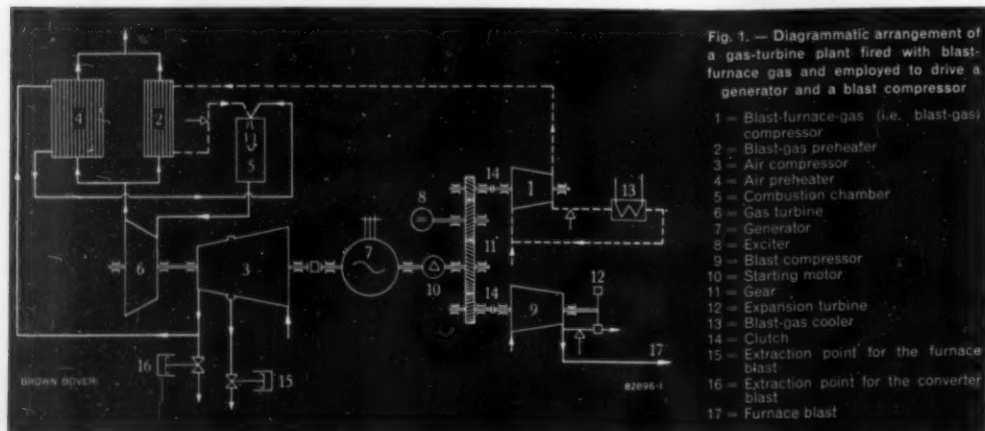
gas turbine and the first commercial unit would not appear before 1970.

The Gas Turbine in Steelworks

Here is an old field where the new gas turbine prime mover can and is beginning to play a very important part. The increasing utilization of gas turbines in steelworks can be attributed to the following reasons: the simplicity of the machine; the modest cooling-water requirements; the possibility of burning gaseous and liquid fuels, singly or simultaneously; and the high thermal efficiency, even at low outputs. The gas turbine has two physical appearances, which are governed by the purpose for which the machine is employed.

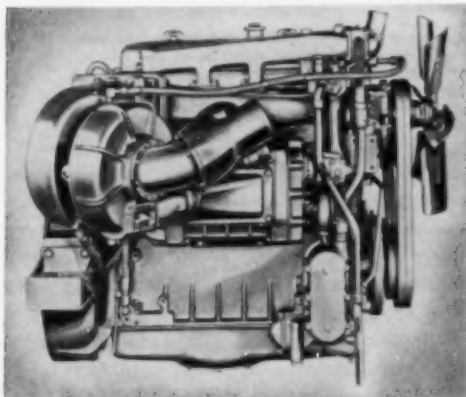
Fig. 1 illustrates the layout of a single-shaft, open cycle gas-turbine set for producing electrical energy. This cycle is particularly interesting for steelworks because, owing to the absence of an intermediate cooler for the air compression, only small quantities of cooling water are required. Solely for the lubricating-oil and generator cooler is it necessary to provide small quantities of cooling water. Apart from driving a generator this gas turbine can also be utilized for driving direct a blast-furnace or a converter compressor (Fig. 1). Extraction at the combustion-air compressor of the gas-turbine plant offers interesting possibilities, a number of which have already been realized in practice. The combined production of electrical energy and blast offers a further possibility; by disconnecting, by means of a clutch, the generator from the gas-turbine set, the latter can be employed for driving the blast compressor, whereby an extremely reliable blast-supply arrangement is achieved.

It is customary in most steelworks to compress and heat the blast in two separate pieces of equipment. Each apparatus burns the blast-furnace gas (referred to as blast gas) supplied to it and has, according to its task, unavoidable exhaust-gas losses. The objective of the gas turbine is to thermally unite these two duties into one so as to reduce the total gas consumption to a minimum. Brown-Boveri and Company in Baden, Switzerland have several gas turbine installations operating in steel mills and these have proven so practical that other turbine manufacturers are carefully looking into this field of application.



Detroit Diesel's ARBA Exhibit

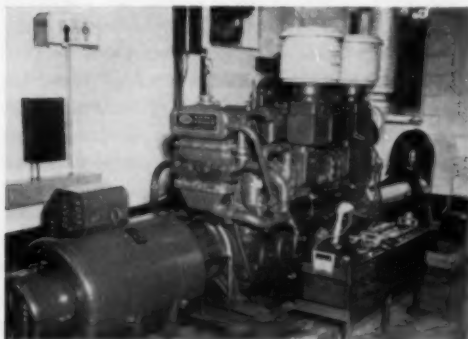
Two-cycle Diesel engines for practically every type of roadbuilding equipment now in use will be displayed by the Detroit Diesel Engine Division of General Motors at the 1957 Convention and Road Show of the American Road Builders' Association. Having their first public showing to the construction industry will be two new Series 71 Turbopower units and the newly-designed 6-110 Roots blower engine. In all, eight models ranging from 95 to 300 basic hp will be shown. Included will be General Motors torque converter and Hydrostarter-models and a 125 kw Diesel-Electric set.



Detroit Diesel 4 cylinder series 71 Turbopower diesel rated at 171 hp.

The new Turbopower engines are four- and six-cylinder units which utilize exhaust-driven turbines and air impellers to supplement the air supply to the cylinders. The result is an engine of increased efficiency with approximately a 17 per cent increase in horsepower or a 15 per cent decrease in fuel consumption over corresponding Series 71 models. These advantages have been attained with no increase in weight-to-horsepower ratios. The engines are rated at 171 and 236 basic hp respectively. The new 6-110 engine is equipped with a high-capacity blower similar to that used on Series 71 models. The use of this blower effects several important improvements. Among these are reductions in height and length which provide a more compact engine with additional free space available for accessory drives. In addition the air supply to the cylinders is increased for improved performance in low-speed ranges. This engine has a basic rating of 300 hp.

Standby Generating Sets



One of the nation's large diesel manufacturers has announced a completely revamped line of diesel electrical generating sets for emergency

service. Building diesel electrical generator sets for such emergency use is the Harnischfeger Corp. of Milwaukee. The sets are built under the P&H brand name at the Harnischfeger plant in Crystal Lake, Illinois. Because hospitals, radio and television stations, telephone exchanges and many industrial plants are virtually helpless without electrical power, many now install standby generating sets such as those produced by Harnischfeger Corp. If the regular highline source of electricity is cut off suddenly, these sets automatically go into operation and provide necessary power until repairs can be made in the highline.

With a high priority given standby electrical power, the government now requires most defense

plants to maintain such emergency generating sets. Also, to make certain hospitals will be able to operate X-Ray equipment, operating room facilities and other vital services in case of enemy attack, the government strongly encourages standby electricity for all medical centers. Equipped with redesigned instrument panels, the new P&H generating sets for standby service include models producing from 20 to 125 kw of power. They operate on diesel oil, which reduces the danger of fire and explosion that could result from storing gasoline particularly during an enemy attack.

The \$64.00 question is, did you have to buy a new engine for your tractor because you left it out last winter and forgot to drain or winterize?

The World's Leading Manufacturers of FUEL INJECTION EQUIPMENT for Diesel Engines



FUEL INJECTION EQUIPMENT DIVISION

of

LUCAS ELECTRICAL SERVICES, INC.

Head Office: 653 Tenth Avenue, New York 36, New York

Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio

West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California

Canadian Distributors:

Joseph Lucas (Canada) Ltd., Head Office: 11 Davies Avenue, Toronto 8, Ontario

Branch Office: 3401 St. Antoine Street, Montreal 30, Que.

AP-174-880



AUTOMOTIVE DIESEL PROGRESS

A COMMENTARY BY MERRILL C. HORINE

Merrill C. Horine, for 38 years a member of the Society of Automotive Engineers, has been actively engaged in automotive engineering, sales promotion and training, advertising and editing of automotive publications since 1907. He has contributed numerous papers on diesel and allied subjects to the SAE and other organizations. An officer in the Air Service in World War I, he was a consultant to the Chief of Ordnance and the Automotive Division of the War Production Board in World War II.

Diesels in COE Trucks

DIESEL economy is just as important in cab-over-engine vehicles as in those of the conventional engine-under-hood type and the rapidly-increasing popularity of the COE type has necessitated its adaptation to diesels. This, however, has not been as simple as merely substituting power plants. Discussion of this subject necessitates differentiation between practice in the highly-specialized models originating in or expressly designed for operation in the eleven far-western states, on the one hand, and the more universal types, adaptable generally to the eastern two-thirds of the country.

That these separate groups exist is due principally to the different conditions of operation and in the legislative restrictions in the respective geographical regions. Maximum legal gross weights, unit lengths and total combination lengths in the eleven western states are more liberal than in the other thirty-six and the District of Columbia; while limits on axle, bogie and tandem weights are more severe. This, with the predominant limitation of gross weight by the so-called Bridge Formula, in the West, has given rise to the general use, in inter-city haulage, of multi-axled combinations so arranged that the first and last axles are as far apart as practicable.

Why West Favors COE

Since the Bridge Formula favors the maximum spread of axles, e.g., wheelbase, this would appear to encourage the use of the conventional type of vehicle, rather than the COE. Actually, though, the opposite trend has resulted. The explanation is found in the fact that the kinds of lading which predominate in long-distance over-the-road operation in the Far West are so low in density that cubic feet of capacity is often more of a problem than tonnage. With conventional vehicles it is often difficult to find space enough in the body for sufficient Balloon freight to come up to the allowable payload capacity. For this reason and despite that length limitations are more liberal there than farther east, a premium is placed upon every available foot of load platform length. Con-

sequently the demand for tractors and trucks with the shortest feasible length from front bumper to back of cab is growing and insistent.

These circumstances have militated against the diesel in the past because of the latter's greater length, height and weight for the large horsepower which Western over-the-road operations require. Distances are great between terminals and competition is keen, not only with the railroads; but between the carriers themselves. It is well recognized that competition by motor carriers with the rails becomes more difficult as the length of hauls increases. For this reason the size and weight of the diesel has proven a severe handicap, though far overshadowed by the drastic savings in fuel cost per mile.

From the combination of all of these circumstances and several other considerations, has emerged the typical Western type of COE. For the sake of maximum payload cubage capacity, lengths from front of bumper to back of cab are condensed to the limit. Bumpers are practically flush with the radiators, with the back of cab virtually in line with the rear of the cylinder block. This puts the flywheel, clutch and transmission back of the cab. Front axles are located as far forward as possible within the overall length and rearmost axles on trailers or semitrailers as far back as similarly possible.

Cabs for such vehicles are arranged in several ways. One popular form sets the cab astride the powerplant, so that a large engine housing occupies the middle of the cab, with seats on either side. In some cases, there is but one seat—the driver's—on the left, with the engine somewhat offset to the right. An alternative scheme simply perches a cab of normal size high enough above the engine to clear it either with a flat floor, or with one slightly dropped on the driver's side. Some of these cabs have a shallow cowl in front of the windshield, while others have the front dash sheet flush with the bottom of the windshield. A third configuration, still in the try-out stage, consists of a narrow one-man cab, similar to those used on power shovels and cranes, at the left, with a wide hood somewhat

to the right of center and an open platform at the extreme right. This formation has long been popular in England and the Continent for buses as well as trucks. In some cases, the narrow cab is elongated to provide a rider's seat in tandem with the driver's.

Eastern Type COE

Contrasted with these forms of construction, the prevailing Eastern type of COE has the front axle set well back, thus providing increased front axle loading and shortening the wheelbase for improved maneuverability. This places the cab door ahead of the fender instead of behind or over it. Here, again the type is dictated by conditions. Shorter maximum lengths of individual units and of combinations are prescribed by the regulations in the Eastern and Mid-western states, while in several important states, axle loads are greater than allowed in the far west, both for single axles and for bogies or tandems. Shorter turning radii are required for the more congested, often narrow and twisting roads and streets in the East, which dictates closer spacing of axles and the distribution of more load on the front axle. In the mobile concrete mixer field, the trend is toward a steady increase in front axle loads, a few dual-axle front ends having actually been put into operation.

Because the average haul is shorter and less-trailer lots more common, the frequency with which the driver must enter and leave the cab is greater. Consequently there has been a strong insistence upon greater ease of ingress and egress. This favors a low-slung cab. On the other hand, though load densities average quite a bit higher in the East than in the West, maximum cubage is nevertheless demanded within the more restricted unit and total length limitations. This has given rise to insistence by many operators on a tractor capable of handling a semitrailer 35 ft long within an overall length of combination not exceeding 45 ft. Several short-coupled conventional tractors have appeared by which this is made possible; but more and more operators are turning to the COE as the best solution of the problem.

Adapting Cab to Engine

In the far West, the accommodation of the diesel in a COE-type tractor has been accomplished by departing almost entirely from Eastern concepts of cab construction—in a word by adapting the cab to the engine. In the East, on the other hand, the effort seems to have been to adapt the engine to the cab. One means to this end has been the tilting of the engine to the right to provide sufficient foot and leg room for the driver, at the sacrifice of the rider, if any, in the right seat. Another solution has been the adoption of diesels of smaller displacement and consequent size, with power output increased by the use of turbochargers. Nothing much has been done so far along the lines of flat or V-type diesels to provide the requisite piston displacement in a more compact package; but developments along this line are in process and may be expected to reach production before long.

Accessibility has suffered in some cases where diesels have been crowded into limited dimensions despite tilting cabs. Take-apart cabs, removable fenders, slide-out power plants and many other schemes have been tried with discouraging results. One make, employing a tilting cab, which formerly did not provide sufficient room for a diesel of adequate power, has found a solution by raising the cab several inches, using a high-domed fender and extra step to adapt the higher cab to the established fender and skirt formation. In several cases radiators and fans have been located so close to the front cylinder that adequate shrouding of the fan and free escape of air has been hindered. This, in combination with close-fitting engine housings, has necessitated fans of such increased capacity as to seriously increase the parasite hp demands.

Fortunately the lower heat rejection characteristic of diesels has made the problem of driver comfort in hot weather less severe than with gasoline power plants; but there are several other problems with which engineers are wrestling. Among these is the provision of exhaust systems which, while preserving moderate backpressure, provide a sound level below 125 sones. Greater convenience of gearshift controls without undue complication, easier access to the engine without intricacy, extra weight and cost, and many others await solution. Forthcoming models from several producers will offer adequate diesels in practical COE vehicles, within reasonable ranges of price and weight, in both Eastern and Western versions. And there is some hope of ameliorating the differences in the two types to an extent that presages the emergence of a universal form. Both diesels and COE construction are bound to predominate in over-the-road hauling and in several other fields. They must be made compatible.

Flexible Couplings Catalog

Torsionally flexible, Morflex couplings are fully described in a new 24-page catalog. The Morflex principle, employing preloaded rubber biscuits as the flexible medium, is explained and illustrated.

Complete dimensions and specifications are given on standard, double and radial type couplings with additional data on coupling driveshafts. Torsional deflection charts and instructions for use

explain the method of coupling selection in controlling the torsional vibration of a system. To receive this catalog write to Morse Chain Co., Industrial Sales Div., Ithaca, N. Y. **(ITS NEW)**

Oil and Gas Power Meeting Nears

Time is running short for those who want to place in their orders for exhibit space at The Oil and Gas Power Division of the ASME annual meeting May 20th through 23rd, 1957 in Louisville, Kentucky at the Kentucky Hotel. This event regularly attracts operations engineers from the various industries that use oil or gas power. These are the men who strongly influence the selection of engines and accessories in their operations, and they come to the meeting for a double purpose—

to get the utmost out of the technical sessions and also to examine the exhibits. This year timely engineering topics such as the conditioning of engine intake air (cleaning and cooling), and pressurizing of compressor stations will be presented during the three days of technical sessions.

In 1956, booth space was completely sold out, and many late applicants were turned down. Those who want to take advantage of this golden opportunity to exhibit their products before so many important purchasing influences in the oil and gas power field are urged to get their order for booth space in right away. Contact Ray Schakel, The Diamond Chain Co., 407 Kentucky Ave., Indianapolis, Indiana for exhibit booth reservations.

ONE OR A DOZEN THE BEST VALUE IN NOISE CONTROL **MAXIM** SILENCERS

The best value because Maxim, the pioneer company in silencing, can point to a store of practical experience second to none in the field of noise control... because Maxim can bring to your problems more years of research, engineering and design experience. Whether your silencing application is standard or "special", Maxim can do more for you.

SILENCERS FOR:

- INTERNAL COMBUSTION AND STEAM ENGINE EXHAUST AND INTAKE
- AIR COMPRESSOR INTAKES AND DISCHARGES
- VACUUM PUMP DISCHARGES
- BLOWER INTAKES AND DISCHARGES
- STEAM, AIR OR GAS DISCHARGES
- JET ENGINE EXHAUST AND INTAKE
- WASTE HEAT RECOVERY

THE MAXIM SILENCER COMPANY

Subsidiary of Emhart Manufacturing Company
94 Homestead Ave., Hartford, Conn.

Gentlemen: Please send bulletins on silencers for:

NAME _____
COMPANY _____
ADDRESS _____



WHAT'S GOING ON IN ENGLAND

CONDUCTED BY BERNARD W. LANSDOWNE

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C., Ltd., Southall, following which he served some five years with that company's sales engineering department. He entered technical journalism as assistant editor of "Gas & Oil Power" in 1950 and was appointed editor in 1952.

Small Portable Gas Turbine

One of the simplest gas turbine units yet produced is now available commercially from David Budworth, Ltd., Harwich, England. It was designed by David Budworth and is suitable for all portable applications. Simplicity has been achieved without sacrificing efficiency or sound engineering principles in this new unit.

The turbine runs at a speed of 45,000 rpm and can be coupled to a 15 to 1 or 20 to 1 reduction gear to give output speed of 3,000 and 2,250 rpm. respectively. The gas turbine consists of an annular combustion chamber surrounding a radial compressor and turbine mounted back-to-back on the same shaft. Air, as it leaves the diffuser is split into three streams, the outermost one keeping the casing of the combustion chamber cool as well as cooling the exhaust pipe and face of the turbine nozzle ring. The centre air stream provides air for primary combustion while the inner one cools the face of the turbine rotor. The design is symmetrical about the turbine axis and the combustion chamber is supported only from three legs on the reduction gear case. This arrangement reduces the likelihood of trouble caused by unequal and restricted expansion that may occur.

The Budworth turbine showing the air inlet filter. The unit will produce up to 60 bhp at an ambient temperature of 15°C.



The fuel system operates at a low pressure of only a few lb per sq in. higher than that of the combustion chamber and the pressure inside the combustion chamber has only to rise slightly with speed for the fuel supply to be cut off altogether and vice versa with a drop in speed. This method of governing is extremely simple but sufficiently accurate for all except some power generation applications when a centrifugal governor can be supplied. Any distillate fuel can be used and when running on gas oil the consumption is given as 10 to 12 gallons per hour. A further illustration of the set's simplicity can be judged from the fact that if required, the fuel can, on starting, be ignited with a match. Alternatively, a simple calor gas system can be supplied where the gas is lit by an ordinary dry battery-operated hot wire, the gas being supplied in a small easily refilled bottle. In either case, the fuel is lit before winding up by hand commences and this much reduces the effort needed to start the engine when it is cold.

Packaged Power for Oilwell Drilling

A new range of packaged diesel units for oilwell drilling has been announced by Davey, Paxman & Co., Ltd., of Colchester, England. They are known as Drilpaks and are based on a standard engine cylinder size of 7 in. bore by 7¾ in. stroke. Units with four, six, eight, 12 and 16 cylinders in V-form are available and the 12- and 16-cylinder designs can be supplied with turbo-pressure charging.

Paxman plan to meet every conceivable oilfield service by offering the basic sets which can be built up by adding optional extras to meet specific requirements. Most important among the optional equipment is the choice of a fluid coupling or torque converter drive. The fluid coupling drive has, of course, been in use for many years but the recent increased demand for engines driving through torque converters has prompted Paxman to arrange with the Brockhouse Engineering Co., for a complete range of torque converters to be available, matched to each engine size. The Brockhouse torque converters will be supplied as standard but other makes, e.g. National Supply, Twin Disc and Torcon, etc. can be fitted if desired.

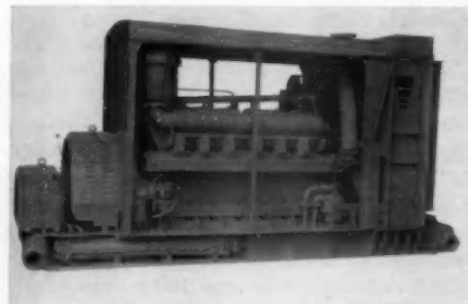
The advantages, particularly from a spares and servicing angle, of power packs based on engines

having a common bore and stroke are readily apparent and I understand that approximately 70 per cent of all component parts throughout the range are interchangeable. The diesel engines used for the Drilpaks are Paxman's RPH and YHX series which are broadly similar except for the combustion arrangements, the YHX being turbo-pressure charged and having direct injection with four valve heads in contrast to the indirect injection used on the RPH series.

Standard equipment to be supplied with the Drilpaks include water cooled exhaust manifolds on the 12- and 16-cylinder RPH engines (dry type are fitted on the remainder); a tropical type radiator with an engine oil cooler incorporated in the circuit; an illuminated instrument panel will also be supplied together with Volkes duplex fuel oil filters, a selection of tools and spares and an instruction manual and spare parts book.

Non-standard equipment available, if desired, includes remote electric tachometer with 60 ft of Neoprene cover cable; a fuel booster pump for use when a gravity head of 6 ft minimum cannot be provided; hand-operated emergency stop acting directly on the fuel pump control valve; automatic safety device to shut down the engine in the event of engine water temperature or oil pressure reaching unsafe limits; sheet steel canopy and numerous other items of equipment. On the 12- and 16-cylinder engines a water injection type exhaust silencer and spark arrester can be supplied complete with outlet bend and one additional pipe flange with bolts if the customer so desires.

The Davey, Paxman 12 cylinder Drilpak set equipped with a fluid coupling.



New Purchasing Agent



Jack F. Spaulding

Thomas E. Hughes, General Manager of Cleveland Diesel Engine Division, General Motors Corporation, has announced the appointment of Jack F. Spaulding as Purchasing Agent at Cleveland Diesel. Mr. Spaulding, whose appointment was effective December 1st, 1956, succeeds A. O. Cash, who is retiring under the General Motors Employee Retirement Plan, after 31 years at Cleveland Diesel. Mr. Spaulding, a native of Cleveland, Ohio, attended Ohio University, Athens, Ohio. He joined the staff of Cleveland Diesel Engine Division's Engineering Department in 1936, and shortly thereafter was transferred to the Purchasing Department. He was named Assistant Purchasing Agent in 1952. Mr. Spaulding is a member of the Cleveland Council, Navy League of the United States and a life member of Sigma Alpha Epsilon. He is married to the former Florence Danforth and lives at 16106 Edgcliff Rd., Cleveland, Ohio.

Automatic Start-Stop Control



A heavy-duty Electrostart diesel engine control that provides automatic start and stop with protective shut down features has been developed by the Lake Shore Electric Corp., Bedford, Ohio. The control operates on 12, 24, and 32 volts, and can be used with any diesel engine equipped for storage battery starting. The versatile control will operate from any type of remote pilot switch, including automatic transfer, temperature, pressure, float, or load demand-type, the manufacturer states. The compact control is available for 5-shot (interrupted-cycle) or 1-shot (single-cycle) cranking. Length of the crank period of the 1-shot model, adjustable from 5 to 60 seconds, is controlled by means of a gas displacement pneumatic timer of exceptional reliability, it is stated.

The interrupted-cycle model employs a universal gear motor and programmed cam to give 5 equal crank periods with 4 equal rest periods between. The timing cam can be provided with any desired cranking program. Crank periods are available from 5 to 30 seconds with overall cranking time of 25 to 150 seconds. Both controls automatically

reset when the engine starts or stops. Protective features of both single and interrupted crank controls include overcranking, over-speed, high water temperature, and low oil pressure. A time delay relay in the protective oil pressure circuit permits the engine to be cranked on zero oil pressure. Each circuit will shut down the engine and light a large bulls eye failure light to indicate the trouble source. An auxiliary bell or horn alarm can also be provided.

A four-position switch on the control panel provides manual, automatic, test and off positions. Automatic reset after a failure is done instantly by turning the switch to Off position. Optional

features available include pushbuttons for manual start and stop, twin starting controls for two engine drives, and failure signals that function without stopping the engine. The control is housed in a compact 15 in. x 15 in. x 6 in. cabinet of 14 gauge steel. The dust-resisting enclosure is provided with knock-outs for conduit and with screw terminals for easy hook-up. Large-size relays with visible contacts are said to add to the ruggedness of the Electrostart control. Wiring is done with No. 14 stranded, thermoplastic insulated wire. Details about the Electrostart diesel engine control may be obtained by writing to the Lake Shore Electric Corporation, 510 Willis Avenue, Bedford, Ohio.

ITS NEW



EATON VALVES

are Backed by 35 Years of Diesel Engine Experience

Eaton Diesel Engine Valves are produced to meet the exacting requirements of Diesel engine service. Through more than 35 years of co-operating with the country's leading Diesel engine manufacturers, and furnishing valves to them, Eaton has developed a thorough understanding of the problems peculiar to the Diesel field. Eaton's experience is reflected in the outstanding performance records achieved by Eaton-made valves in all phases of Diesel engine service.

Eaton Diesel Valves are produced in a wide range of materials, and in both faced and unfaced designs.

Our engineers will welcome the opportunity to discuss the application of Eaton valves to your engines.

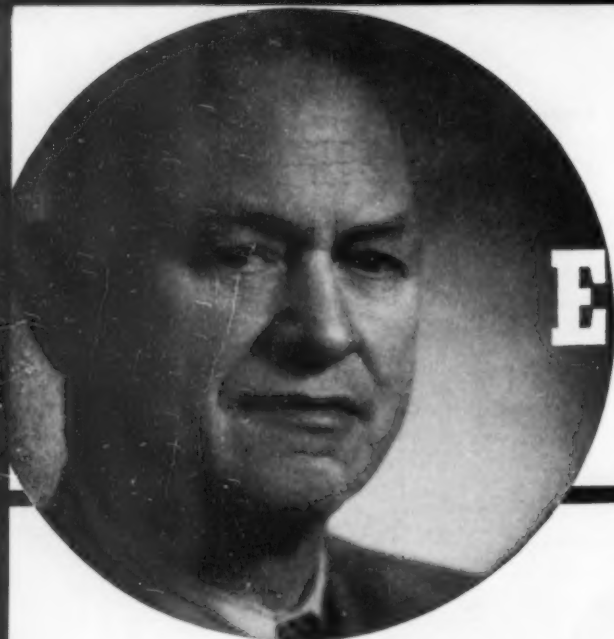


EATON

VALVE DIVISION
MANUFACTURING COMPANY
9771 FRENCH ROAD • DETROIT 13, MICHIGAN



PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Springplates • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamic Drives, Brakes, Dynamometers



EASTERN DIESEL OBSERVATIONS

A COMMENTARY BY ARNOLD B. NEWELL

Arnold B. Newell, a third generation American, was born near Seattle, Washington of pioneer stock. He obtained his engineer's license at 21. Sailed as chief engineer on one of the first ocean-going motorships built in the U.S.A. In 1924 he joined New York Shipbuilding Company in diesel advisory capacity, tested and took to sea New York-Werkspeer diesels, supervised operation of shipyard owned vessels, then in 1927 joined Ingersoll-Rand as diesel field engineer. Became associated with "Motorship" in 1929. Subsequently became managing editor of "Motorship" and "Diesel Power," then vice-president and general manager.

Air Cooled Diesels

Sooner or later the air cooled diesel of comparatively high power will be in more common use in this country. Up until now only engines of low power with air cooling have been placed on the market, although larger ones are found in Europe. Undoubtedly one of the most interesting developments in the field of air cooling has taken place in Detroit at the plant of the Continental Aircraft & Engineering Corp. where I saw a V-12 rated 750 hp at 2400 rpm weighing 5 lb per hp. Including the transmission system, the total weight of engine and attached accessories was 4200 lbs. This is a 4-cycle 1790 cu in. unit with cylinder banks arranged on an angle of 90°. It is, of course, extremely compact. The parent design is a gasoline motor used in Army tanks.

At the time of writing no decision had been made regarding production and marketing this remarkably small and light engine. The particulars of design was presented before the annual SAE conclave in Detroit in January. They will prove to be interesting to the diesel fraternity of manufacturers and users as well. While I foresee a great demand for all diesels of light weight and small dimensions, these characteristics are by no means confined to air cooled engines. In fact it has proved to be somewhat more difficult to bring the air cooled engine down to small dimensions than has been true of the liquid cooled units. Since this development is in such an advanced stage, it will soon become necessary to weigh the relative values of the two methods of cooling. It, of course, eliminates the several difficulties associated with water cooling, one of which is corrosion and another is temperature control under all conditions of operation.

While the accessories for water cooling are not needed, the air cooled engine requires accessories of another kind to circulate the air over the finned jackets of the cylinders and through the oil coolers for the circulation of oil is depended upon to do some of the cooling. The elimination of water as a coolant will preclude the possibility of frozen and broken water jackets which is very important in the arctic regions. In limited space as on the diesel locomotive, the elimination of the entire system of water cooling will appeal strongly. On the other

hand, on boats the need of a rather bulky air duct system to carry the heated air out of the confinement of engineroom will not appeal strongly.

No matter how well or how poorly we may now evaluate the need of air cooled diesels, the fact remains that when a development reaches as far as this one has, it is apparent that such engines, at least in the medium power range, are becoming a factor to be reckoned with.

Minor Markets

We are disposed to measure the diesel market potential in terms of major applications such as locomotive building, marine installations, expansion of the open highway trucking industry, future demands for mechanized equipment in highway construction, the growth of the oil industry and the further development of off-shore drilling. However, as we circulate around amongst the dealers and distributors we learn that mass purchases have a way of going up and down and during the slack periods they are glad to have built up a customer following amongst the smaller operators.

A utility company buys one or two specially equipped tractors for pole setting on right of way, a hospital needs an emergency set, an estate owner decides to convert some of his forest into lumber with a diesel driven saw mill, a fruit farmer finds he needs another dozer for orchard expansion and a dirt farmer decides to install an irrigation system, an oil company needs new engines for oil barge pumping and a boat owner intends to repower a tug, while a mountain group pools funds and builds a ski slope to attract more trade to their resort. The variety of such applications is endless and therefore the cumulative value of these minor markets is big. They constitute the in-between-activities that amount to the difference between profit and loss for many a dealer willing to cultivate and develop them between periods of mass buying by the major users of diesels.

Injection Test Equipment

In one respect the diesel engine is the same today as it was when Rudolph made the first one run:

Lacking correct combustion it is a mess from crankcase to exhaust pipe, from fuel nozzles to piston rings, from cylinder head to oil filter. In short, when combustion is bad everything is snafu and yet we find diesels running by the millions in all classes of service and giving no trouble.

Perfect performance is due to availability of equipment which restores to all elements of the fuel injection system the original new condition. At one time we could pull the injection valves, clean the atomizers, grind the needle valve, install a new set of flame plates, check the lift, adjust the time of injection, take a set of indicator cards, work out the horsepower per cylinder, take a look at the exhaust through a try-plug hole, check relative exhaust gas temperature, adjust the load on each cylinder to establish equal output, and you had it doing fine ready to continue for a week or a month without touching anything. All this could be handled in the engineroom with no special tools. Failing to do it resulted in stuck rings, excessive cylinder wear and sometimes piston seizure. Combustion residues contaminated lubricants, bearings worn excessively, oil filters fouled up, too much oil thrown away and there was too little power output.

The modern diesel will kick up the very same kind of a riot if the fuel system is not properly maintained. The mode of operation is as different as day is to night and woe betide the mechanic who resorts to monkey wrench and screw driver technique. All of the thinking is built into the engine. Its correct operation is governed by the perfection of design and manufacturing facilities of the companies who produce the tools to work with. The fuel injection test stand, the injector tester, the supply of parts from the original manufacturer, the training of the maintenance man in factory procedure and his aptitude for the work are the important factors. Terminology is changed and we hear of fine adjustment popping, fuel pump calibration, the spray pattern, etc. In short, the procedure is to look at what will happen in the combustion space instead of checking it after it has happened. To this end it is necessary to have in the maintenance shop the excellent equipment built by specialists who serve the field as well as the diesel engine makers.

West Coast News

By James Joseph

PORTLAND'S Pacific Builders Supply Co., has taken delivery of a Fairbanks-Morse Model 45B4-1/8, 10 1/2 hp diesel generating set.

OPENED in Montebello, Calif., a new branch of Cummins Service and Sales, at 1105 South Greenwood Ave. Managed by George Hedstrom, branch became operative Jan. 7.

AIMED AT small but heavy earthmoving jobs is Shepherd Machinery Co.'s new, small, heavy-duty crawler dozer, powered by a 50 hp Caterpillar engine. Called the 233 Industrial Tractor, mighty midget is designed to fit small tilt-bed truck.

TO BERNIE Cutting, Westport, Wash., a 300 hp Model NHRMS-600 Cummins diesel engine to power a sport fishing and crab boat.

DELIVERED by Anderson-BeVier, three Figure 333 Wheatley pumps powered by Allis-Chalmers model 4B-153 natural gas engines.

FOR R. Duncan Allan's sports fishing and crab boat, operating from Grayland, Wash., a 105 hp model JF-6-M Cummins diesel engine.

LOS ANGELES' E. J. Kelly & Associates has taken delivery of a Fairbanks-Morse model 38F5 1/4, 10 cylinder, 750 hp diesel generating unit.

SOLD for crane service, an Allis-Chalmers model DC-1879 diesel engine, via Anderson-BeVier.

WESTPORT, Washington's Frank L. Lambertson has powered his crab boat with a 165 hp model HRM-600 Cummins diesel.

FOR ADDED power in sand-fracturing of oil wells, BJ Service, Inc., Long Beach, Calif., has developed a self-contained, mobile fracturing unit powered by two 600 hp Cummins VT-12 diesel engines. Well service firm fields its own units, though rig is sold export.

TO EQUIPMENT Service Co., Long Beach, Calif., two 275 hp NHPS-6 Cummins diesels—for coupling with generators for use on military missile launchers.

CLARK Paige has purchased from Hanson Equipment Co., Santa Maria, Calif., an HOD Hough Payloader powered by a 125 hp JN-6-BI Cummins.

FOR standby service in its liquid rock-

et propellant plant, Aerojet-General Corp., Azusa, Calif., has taken delivery of a model HRCIP-4 Cummins coupled with a 40 kw Electric Machinery generator.

TO REPLACE a gasoline engine in its R-200 International tractor, Sun Battery Co., Santa Ana, Calif., has purchased a JT-6-B, 175 hp Cummins diesel.

TO OLYMPIA Towing Co., Olympia, Wash., a 175 hp Model JT-6-M Cummins turbodiesel engine for powering a towboat. Sale via Cummins Diesel Sales of Washington, Inc., Seattle.

SOLD BY Los Angeles' Anderson-BeVier Co., Inc., seven Allis-Chalmers Model HP-326 natural gas engines for oil well pumping.

NOW AVAILABLE! The Completely new Volume 21 of **DIESEL ENGINE CATALOG**. This giant, fully illustrated reference book containing complete and detailed engine and accessory sections is bigger, better than ever before. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Orders are being accepted for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company order forms to **DIESEL PROGRESS**, 816 N. La Cienega Blvd., Los Angeles 46, California.

Stop Grinding Your Diesel Dollars!

While your Diesels are "grinding-out-the-hours," be sure that dirt and sludge are not doing a grinding job on your maintenance dollars! Grit, you can't even see, can produce enough abrasive wear to actually cripple a Diesel. And, it doesn't take long! Constant, uniform filtration... **WIX ENGINEERED FILTRATION**... is the only, practical method of removing contaminants from fuel and lube oils.

Keep abrasive foreign matter and tarry sludge out of your Diesels with **WIX OIL FILTER CARTRIDGES**. They are engineered to give greater protection and longer service at an amazingly low cost, compared to the money they save!

Write for the free **WIX Master Catalog** today.

wix®

OIL FILTERS CARTRIDGES

AUTOMOTIVE • INDUSTRIAL • RAILROAD

WIX CORPORATION • GASTONIA • N. C.

In Canada: Wix Accessories Corp. Ltd., Toronto

Your choice of many outstanding Filtrants engineered to give you prescription-type Cartridges for your particular operating conditions. Peak dirt retention capacity built into every Filtrant—giving you longer intervals between Cartridge changes and higher filter efficiency throughout the life of every Cartridge.

Florida Diesel News

By Ed Dennis

RECENTLY launched at Diesel Engine Sales of St. Augustine, were the 67 ft *Little Pete* for H. R. Peterson; the *Miss Virginia* for Wilson Shrimp Co., both call Tampa their home port and are powered with D342 Caterpillar diesels

and the 53 ft *Kim* for E. J. Kirby with a D326 Cat.

P & H Harnischfeger Corp. reports that the Allied Equipment Inc. is their new distributor for South Florida for the P & H diesel units for industrial use and the Cahart Machinery Overhaul Corp., Miami handles their diesel generating sets.

A Cummins model HRBIS, rated 225 hp, was installed in a locomotive by Hercules Powder Co. of Brunswick, Ga. and the *Mary-Frances II*, a private yacht owned by Stuart Butler of Ponte Vedra Beach, had a marine model HRM 165 hp engine installed.

ELLIS Diesel Engine Sales & Service in Ft. Lauderdale, repowered the 50 ft

cabin cruiser *Ambrosia* with two general Motors 6-71 diesels using the same Twin Disc 2:1 r&r gears for a reported increase in speed and a drop in fuel consumption over the replaced gasoline engines. A 3 kw Onan diesel generating set was also included.

THE 140 ft dieselized freighter *Inagua Rover* recently delivered to the West Indies two D8 Caterpillar tractors, a 2 yd Bucyrus Erie Murphy dieselized dragline, a model 240 Cleveland ditch digger with a 4 cyl. International diesel and several other pieces of diesel equipment.

HERCULES diesels model DIX672, power the Hough Payloader tractor shovels that were delivered to A. J. Parker of Miami and the Birdsall Co. of Palm Beach by Florida Georgia Tractor Co.

SHELLEY Tractor & Equipment Co., Miami, recently delivered a #12 Caterpillar road grader to Naranja Rock Co. and Broward Asphalt Co. while a D9 Cat tractor went to the Oolite Rock Co. and a D342 Cat diesel for a Key West shrimper.

TEAMING up, on a 42 in. water pipe laying job in Coral Gables, for Constructors of Florida Inc., a Pettibone-Mulliken Speed-all front loader with a GM 3-71 diesel and Allison torque converter and a Buda dieselized Wagner LD II scoopmobile.

AT PORT Everglades, the 87 ft tug *Challenger* is powered with a UDST Superior, 14½x20 diesel rated 675 hp at 300 rpm. Engine room also contains a 4 cyl. 15 kw Cummins diesel generating set and a Cummins diesel drives the Gardner-Denver air compressor through a Twin Disc clutch.

GENERAL Motors dieselized trawlers that were recently launched included the 53 ft *High Life* for Alfred Cannes, with a model 4071 and Allison 4.5:1 r&r gears while the *Vivian Lee* and the *Debbie* had 6071 diesels with Allison 4.5:1 r&r gears and Rockford power take-off installed.

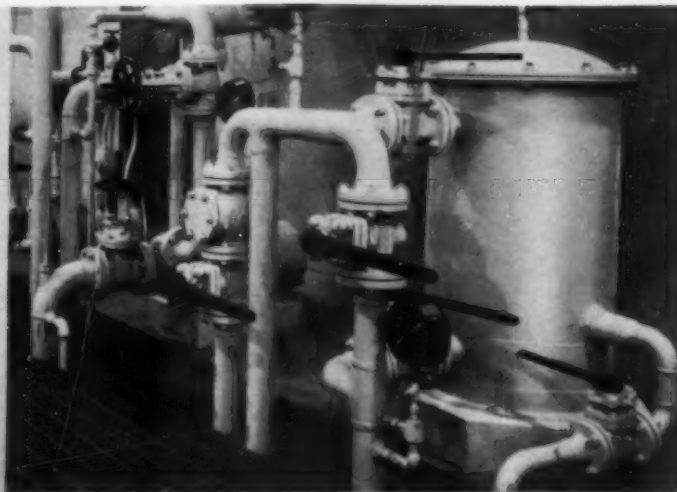
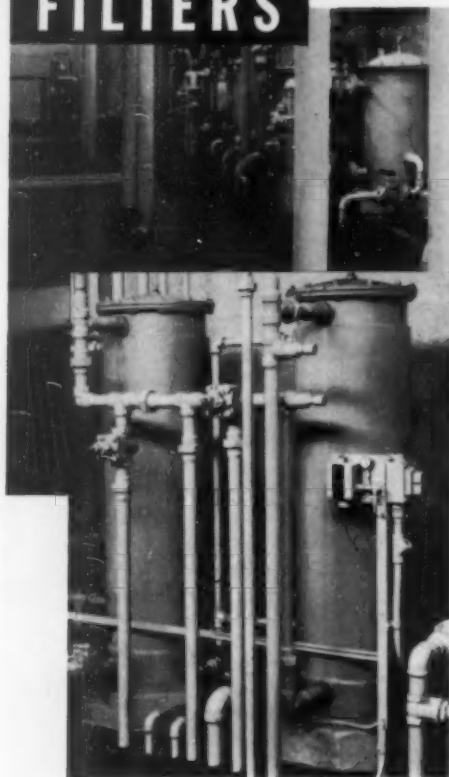
A 750 hp Fairbanks-Morse 10 cyl. model 38F5¼ diesel generating set was selected by the Southern Bell Telephone & Telegraph Co., for installation at their Atlanta Ga. facilities.

RECENT Cummins dieselized tractors for Florida hi-way freighters were a model NHB 600 rated 200 hp in an Autocar for F. D. Peterman of Jacksonville and a similar installation for W. T. Cowart Fruit Co. of Ocala. All were made by Cummins Diesel Engines of Florida in Jacksonville.

WINSLOW Full-Flow FILTERS

Case History Report No. 34 Shows Why Engines

Protected by WINSLOW FILTERS Last Longer



Three 1,750 Nordberg Diesel engines have been operating more than three years on the Kamloops pumping station of Trans Mountain Pipe Line Company. Although these engines are burning crude fuel, the protection of Winslow Full-Flow Filters for both lube oil and fuel has made possible a record of performance and economy equal to that of engines burning refined fuel. At the left is one unit in the specially designed two-pass system for fuel filtration.

20,000 HOURS OPERATION—Parts Replaced ONLY \$300

CP* FILTRATION

Winslow patented CP* (Controlled Pressure) elements are designed to continuously self-adjust the pressure within the filter and allow for a full stream of filtered oil without opening by-pass valves. This is accomplished through the dual flow capacity, with two types of material.

After 20,000 hours operation in a three-year period, the first Nordberg Diesel in a Trans Mountain Pipe Line station was recently overhauled. In spite of the use of crude fuel, and difficult operating conditions, the engine was in such good condition that only \$300 worth of replacement parts was required. This is another striking example of the long engine life and the substantial savings in overhaul time and replacement costs when dirt, acid, moisture and other impurities are removed by Winslow Filters. Standard or special installations of Winslow Full-Flow Filters can give you equal engine economies. Please write for complete information.

CP* is fully protected by patents and trademarks

WINSLOW

ENGINEERING & MANUFACTURING COMPANY

4069 Hollis Street, Oakland, California

TWO TD International, series 142, tractors went to Palm Beach County to be used on mosquito control work and a TD 9 International dieselized Drott skid shovel went to Triple A Demolition Co. of Fort Lauderdale, all from Florida Georgia Tractor Co.

AT Ft. Lauderdale, Shelley Tractor & Equipment Co. installed a model D375 Caterpillar 262 kva generating set for emergency use in the Holy Cross Hospital. Installation also included a Woodward UG 8 governor, Burgess-Manning silencer and a Quincy air compressor.

TWO model DOOD Hercules 4 cyl. diesels each rated 79 hp at 2600 rpm with 1.5:1 Higgens marine rkr gears, will power the new 40 ft sports fisherman being built at Chris Boat Yard on the Miami River.

NEW Multi-Purpose #2460 Gradalls were acquired by the Ehly Construction Co. and Mc Hugh Bros. Mounted on a truck and powered with GM 3-71 diesels, the GM power take-off is used to drive the hydraulic pump. These machines are being used for ditching on sewer projects and also to dig the holes for swimming pools.

INTERNATIONAL diesel road construction equipment recently added to South Florida included a TD 18 tractor to A. J. Parker, a TD 24 dozer with a Torque converter to E. L. Montgomery of Ft. Lauderdale plus the TD 14 tractor that was delivered to the Birdsall Co. of Palm Beach.

Rocker Arm Refacer

Storm-Vulcan, Inc., Dallas, Texas, announces a new addition to their line of Automotive Engine Rebuilding Machines. This machine is the Model 911 Rocker Arm Refacer which resurfaces Rocker Arms to original factory finish and accuracy. One of the outstanding features of this machine is that it is fast and easy to operate and requires no special power unit. The grinding wheel is driven with any ordinary valve seat grinder, electric drill or impact wrench. The Model 911 Rocker Arm Refacer can be used on any bench—no extra space required. Catalog and complete information is available from Storm-Vulcan, Inc., 2225 Burbank St., Dallas, Texas.

ITS NEW

Miami Boat Show

J. Frank Knorr, president, announced the South's greatest marine exposition, the 16th annual Miami International Boat Show to open at the Dinner Key Auditorium on February 22nd 1957. The theme, "Show It In Miami And You Show The World". The Show will

run daily thereafter from 11:00 AM to 11:00 PM through February 27th. Over 200 Florida, National and International manufacturers and distributors of boats, marine engines and their accessories will display their 1957 nautical line valued in excess of \$1,000,000.

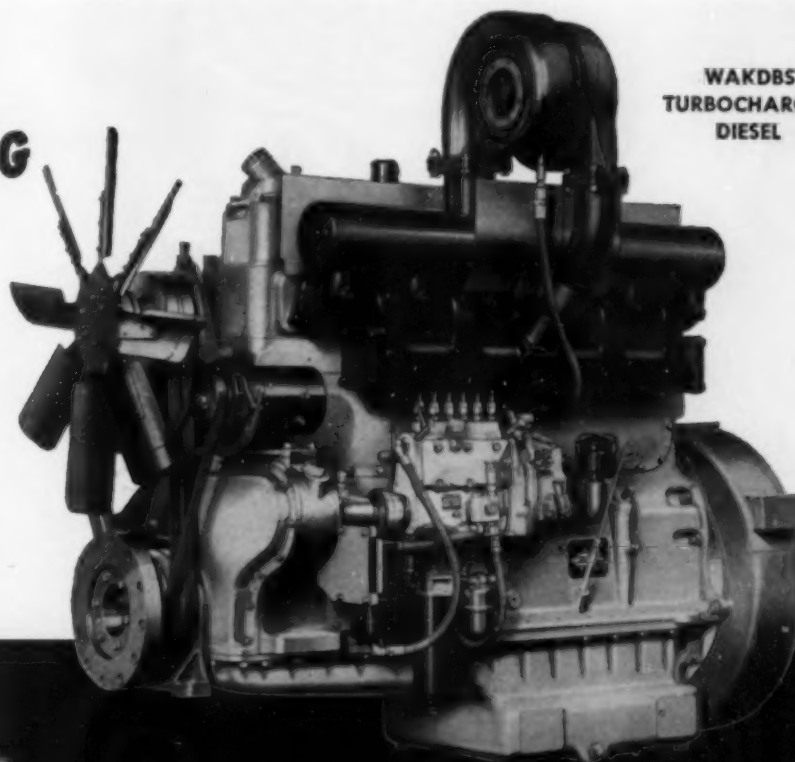
Made fast to the huge Dinner Key Auditorium will be a wide range of ves-

sels from large flying bridge cruisers to tiny dinghies. Some boat manufacturers will feature actual water demonstrations on Biscayne Bay. Inside the auditorium, diesel engine manufacturers, will play a prominent part in the marine display. General Motors along with Continental Motors will have their usual fine exhibit. The Buda division of the Allis-Chalmers Mfg. Co., Gray Marine, Enterprise,

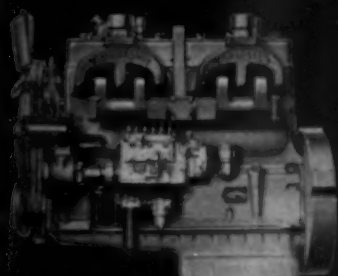
Fairbanks-Morse, Caterpillar Tractor and Hercules will also be prominently displayed among the marine diesel engines at Miami, Florida, America's Winter Yachting Center.

The best way to keep a good backlog of maintenance work ahead of you is to put off until tomorrow everything you can do today.

FOR
HEAVY
HAULING



WAKDBS
TURBOCHARGED
DIESEL



WAKDB NORMAL DIESEL



WAKR BUTANE

WAUKESHA

1197 CUBIC INCH

Extra Heavy Duty ENGINES

Up to 352 max. hp, all with counterbalanced crankshafts

Write for descriptive bulletins

Truck powered by Waukesha WAKR (Butane)



327

WAUKESHA MOTOR COMPANY

Waukesha, Wisconsin

New York Tulsa Los Angeles

Mid-Continent

Diesel News

By Jack F. Cozier

PECOS Dairy, Pecos, Tex., has purchased four Kenworth 521 conventional tractors with sleeper cabs powered by Cummins HRBB diesel engines with

Luber-Finer oil filters. The units were sold by Texas Kenworth Corp., Dallas, Tex., for hauling milk from Dallas to Pecos.

REFINERY Engineering Co., Tulsa, Okla., bought two 22-B Bucyrus-Erie truck cranes, one to be used for refinery construction on the Suntide refinery at Corpus Christi, Tex., and the other

unit to be used on refinery construction in Alberta, Canada. The units are powered by GM 3-71 diesel engines and were sold by Butler-Sparks Equipment Co., Tulsa.

AMERADA Petroleum Corp., Tulsa, Okla., purchased through Southwest Industries a Cooper-Bessemer model GMXD-6, 400 hp, 450 rpm, skid-mount-

ed, two-stage gas compressor for gas lift service in Bloomington, Tex.

S. R. SMITH Construction Co., Tulsa, Okla., has repowered an Allis-Chalmers HD-5 front-end loader with a model 2-71 GM diesel engine from Diesel Power Co., Tulsa. The unit is used for material handling.

HERCULES-Lupfer Engine Sales Co., Tulsa, Okla., has sold a Hercules GO-226 gas engine for installation on a servicing unit to be used for drilling.

TEXAS Kenworth Corp., Dallas, Tex., has recently held an open house inaugurating their new sales and service building recently occupied.

BREWER McMichael Construction Co., Holdenville, Okla., recently purchased two S-7 Euclid scrapers powered by GM model 4-71 diesel engines. The units are being used at Preston, Okla., for approaches on a state highway bridge. The sale was made by Butler-Sparks Equipment Co., Tulsa, Okla.

OWENS Illinois Glass Company, Toledo, Ohio, has bought three Fairbanks, Morse model 38D8-1/4, six cylinder, 960 hp engines.

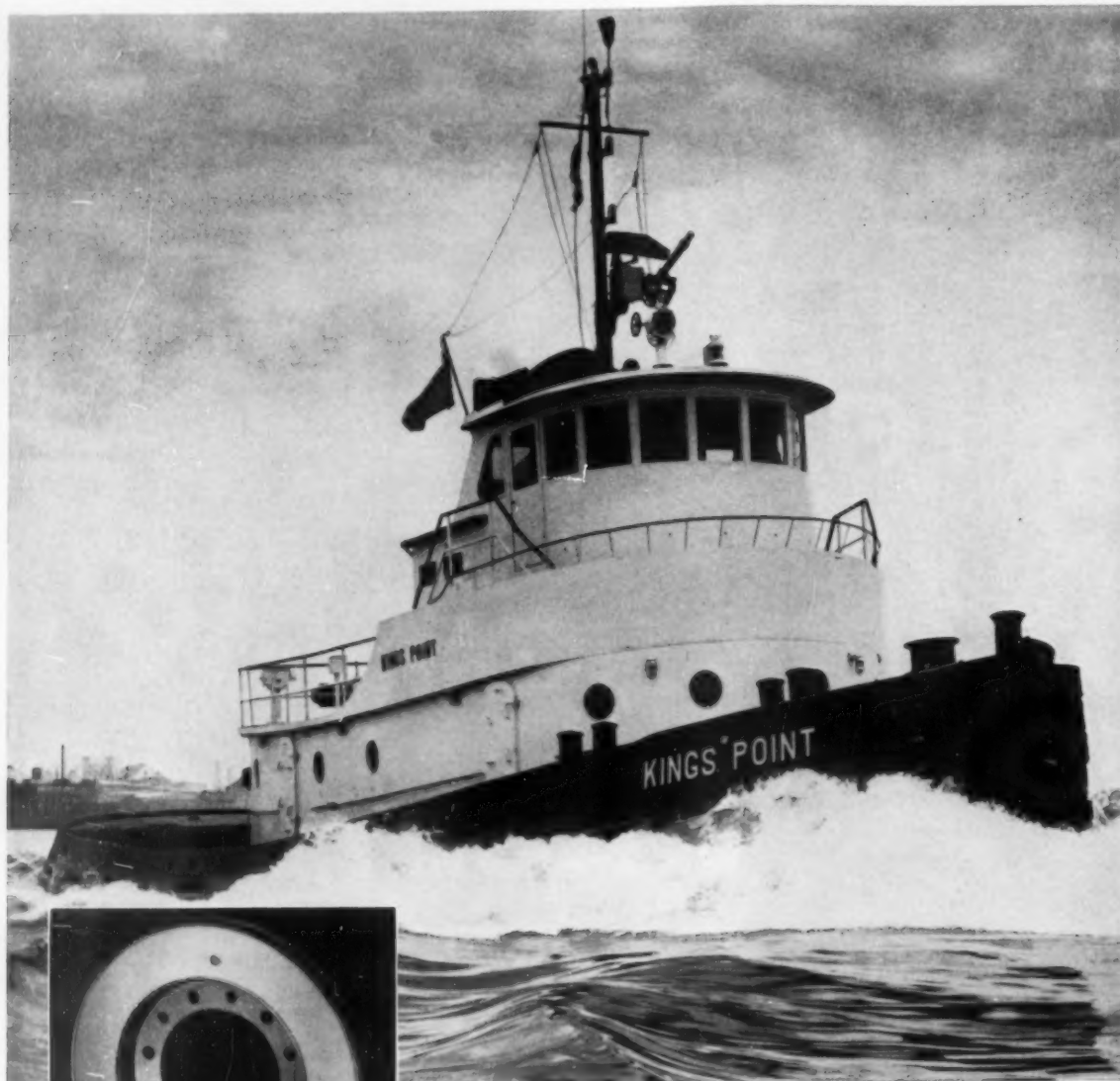
JOHNSON-Wilson Construction Co., Oklahoma City, Okla., purchased an S-12 Euclid scraper from Butler-Sparks Equipment Co., Tulsa, Okla. The scraper will be used at Pawhuska, Okla., for constructing a city lake for a water supply. This Euclid unit utilizes the power of a GM 6-71 diesel engine.

FROZEN Food Express, Dallas, Tex., is using a Kenworth truck that has covered over 135,000 trouble-free miles. The truck is a Kenworth Cab-Over-Engine model 522 with a Fuller R-960-C transmission, a Luber-Finer filter and is powered by a Cummins HRFB diesel engine.

TERRY Overby, drilling contractor, Nowata, Okla., bought a Joy AP2 1075 cu ft, skid-mounted air compressor to use for air drilling on his rigs. The compressor is powered by two GM 2-71 diesel engines and was purchased from Butler-Sparks Equipment Co., Tulsa, Okla.

HUMBLE Oil & Refining Co., San Antonio, Tex., has purchased a Kenworth 921 tractor powered by a Cummins HRFB diesel engine with Luber-Finer oil filter. The unit sold by Texas Kenworth Corp., Dallas, Tex., will be used for petroleum transporting.

POOLE Brothers Construction Co., Shawnee, Okla., has bought three 1-UD ten ton Euclid end-dumps powered by



POWER PROTECTED... with a Houdaille Vibration Damper

Torsional Vibration Dampers...

are part of Houdaille's complete line of special-design hydraulic products for the marine, railroad, aircraft and general industrial fields. Experienced engineers are at your service for any application involving hydraulics. Write for additional information or specification sheets.

The 2100 hp. Alco diesel which makes the *Kings Point* the most powerful harbor tug in the United States, is equipped with a Houdaille Torsional Vibration Damper on the engine crankshaft.

Houdaille's exclusive design, utilizing the shearing action of the highly viscous fluid, permits the building of diesel engines with increased horsepower. Because the Houdaille damper is *untuned*, it is equally effective across the full range of engine criticals.

HOUDAILLE INDUSTRIES, INC.

BUFFALO HYDRAULICS DIVISION

537 East Delavan Avenue • Buffalo 11, New York

4-71 GM diesel engines. The units will be used to load a crusher at Grainola, Okla., on a road project. The sale was made by Butler-Sparks Equipment Co., Tulsa, Okla.

SIMMS Construction Co., McAlester, Okla., bought an American model 600 tractor powered by a Continental diesel engine for use on local phone company work. The sale was made by Tulsa Equipment Co., Inc., Tulsa, Okla.

TROTH Construction Co., Oklahoma City, Okla., purchased a Cat D6 tractor and Bulldozer from McCormick Machinery Co., Tulsa, Okla., for pipe line construction work.

TEXAS Engineering & Construction Co., pipe line contractors, Amarillo, Tex., took delivery on a Cat D6 tractor with MD6 pipelayer from West Texas Equipment Co., Amarillo.

MONARCH Construction Co., Tulsa, Okla., has bought a TD-6 International tractor with loader to be used with an asphalt plant. The sale was made by the Clarence L. Boyd Co., Tulsa.

READY-MIX Concrete Co., Muskogee, Okla., has purchased three Allis-Chalmers W-2 gas power units for use in portable mixers with the power units to be delivered by the Boardman Co., Tulsa, Okla.

STAMPER & Payne, Claremore, Okla., received a Cat D7 tractor and bulldozer from McCormick Machinery Co., Tulsa, Okla. The unit will be used for PMA and SCS work.

LONE STAR Constructors, Big Lake, Tex., purchased two 600 cu ft Chicago Pneumatic compressors powered by GM 6-71 diesel engines. The units will be used on a Humble Oil Co. pipe line and were sold by R. A. Young & Son, Inc., Tulsa, Okla.

Centrifuges For Bulk Carrier

The keel has been laid for the largest oceangoing bulk carrier ever to be built in Canada. Scheduled for delivery in October, 1957, hull 269 will be a whopping 21,000-ton deep sea bulk carrier, capable of hauling the biggest pay load over the longest distance. Said to cost over \$5,000,000, the vessel is being built by Canadian Vickers, Ltd., Montreal, for Westriver Ore Transports, Ltd., of Montreal, Canada. Still known only as hull 269, the bulk carrier will be equipped with a Nordberg 6800 hp diesel engine and Nordberg generating units. An order for seven Westfalia lube and fuel oil separators has been placed with Centrico, Inc., Englewood, N.J., for use in purifying the lubricating and

diesel oils, and for processing highly viscous residual oil which is used as fuel for the ship's main engine.

In addition to the normal lube and diesel oil purifiers, the new Westfalia equipment includes labor saving, continuous centrifuges of latest design with automatic, self-cleaning bowls. Centrico will also furnish the necessary heating

equipment. The residual fuel plant will have an hourly capacity of 400 gallons when handling oil with a viscosity of 5000 SSU at 100 F. The centrifuges will be equipped with hydraulic bowl lifters. In addition, the OG units, as well as the two MOC-4015 lube oil separators, will have exchangeable sludge liners to cut the usual downtime for cleaning.

NOW AVAILABLE! The Completely new Volume 21 of **DIESEL ENGINE CATALOG**. This giant, fully illustrated reference book containing complete and detailed engine and accessory sections is bigger, better than ever before. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Orders are being accepted for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company order forms to **DIESEL PROGRESS**, 816 N. La Cienega Blvd., Los Angeles 46, California.



Those who've used it know . . . the addition of FOA-2 to diesel fuel minimizes filter-plugging, injector-sticking and other problems caused by sludge.

Diesel fuel problems often solved by Du Pont chemical additives

The formation of deposits or residues in your fuel can cost you money.

Improved usability of a greater variety of stocks, plus economy, are two of the benefits you can obtain with DuPont Fuel Oil Additive No. 2 (FOA-2) and DuPont Metal Deactivator (DMD).

Improved characteristics

A growing number of oil companies rely on FOA-2 to impart improved characteristics to a great variety of fuels. You, too, can be assured of good results with

a wide range of fuel stocks.

Economy

Your maintenance costs go down when you burn fuel protected with either FOA-2 or DMD—or both. FOA-2 relieves filter-plugging and injector-sticking problems because of its outstanding stabilizing and dispersant actions.

DMD retards the formation of troublesome gel accumulations—brought about by the harmful ef-

fect of copper or bronze on fuel oil.

If your present fuel—high-grade or economy—gives you less than the performance you expect, check to see if the situation could be improved with DuPont FOA-2 and/or DMD.



Petroleum Chemicals

E. I. DU PONT DE NEMOURS & CO. (INC.) • Petroleum Chemicals Division • Wilmington 98, Delaware

Gulf Coast Diesel

Notes

By Michael T. Pate

J. L. WILLIAMS Construction Company, Inc., Houston, has bought from Applied Power Equipment & Mfg. Co., Houston, a model HP 326 Allis-Chal-

mers (Buda Division) 6-cylinder 145 hp engine which will be used to replace the engine in a ditching machine.

MAGCOBAR Mud Company, Houston, has bought from Mustang Tractor & Equipment Company, Houston, a model D337F Caterpillar diesel-electric plant rated at 150 kw which will be used in the company's local plant.

HEAD & Guild, Houston, will power Lorain cranes on two offshore drilling platforms with as many series 71, model 2030C General Motors diesels, rated at 40 hp. The diesels were furnished by Stewart & Stevenson Services, Inc., of Houston.

PHILLIPS Petroleum Company, Houston, has secured from Waukesha Sales & Service, Inc., of Houston, a model 6NKDBSU Waukesha diesel, rated 342 hp at 1100 rpm, which will be used to drive an ac generating set.

SANTA FE Railway, Tie & Timber Treating Division, Somerville, Texas, will repower a 25-ton Whitcomb standard gauge locomotive with a series 71, model 6080 torque-converter equipped General Motors diesel secured from Stewart & Stevenson Services, Inc., Houston.

HUNT Tool Company, Harvey, Louisiana, has secured from Big 3 Welding Equipment Company, of Houston, a 250 amp Lincoln arc welding generator which is driven by a model DIX4D, 4-cylinder Hercules diesel, rated 40.5 hp.

SOUTHERN States Drilling Company, Longview, Texas, has secured from Stewart & Stevenson Services, Inc., of Houston, three series 71, 6-cylinder model 62406 General Motors diesels which will be used to power a drilling rig. The company also bought a series 71, model 12103 twin-six General Motors diesel to power an Emsco BA-14 mud pump.

SUGARLAND Industries, Sugar Land, Texas, has bought from Stewart & Stevenson Services, Inc., Houston, a series 71, model 4030C General Motors diesel which will be used to drive a Pacific centrifugal pump on an irrigation project.

SCHLUMBERGER Well Surveying Corporation, Houston, has bought from Applied Power Equipment & Mfg. Co., Houston, a model BD 77 Allis-Chalmers (Buda Division) 2-cylinder 15 hp diesel which will be used to power a special well surveying unit.

J. R. FANNING Construction Company, Lubbock, Texas, has purchased two Stewart & Stevenson model 110GD-165C generating sets, rated 165 kw. Each generator is driven by a General Motors series 110, 6-cylinder model 62406 diesel and will be used in an asphalt blending plant of the portable type.

C. A. MCKINLEY & Sons, Beaumont, Texas, will install in their tug *Nellie* a Caterpillar diesel, model D326F equipped with a Twin Disc 3:1 reduction and reversing gear. The diesel,

rated 134 continuous hp at 1600 rpm was furnished by Mustang Tractor & Equipment Company, of Houston.

BELL Marine Service, Houston, will power a 55 ft twin screw tug with a matched pair of series 110, 6-cylinder, model 62206 General Motors diesels, each equipped with a General Motors 4½:1 hydraulic reversing and reduction gear. The diesels were secured from Stewart & Stevenson Services, Inc., of Houston.

BENTON Construction & Shipbuilding Company, Inc., Port Arthur, Texas, will power an 80 ft steel offshore boat under construction for the Andike Corporation with a matched pair of General Motors series 110, 6-cylinder model 62206 diesels, each equipped with a General Motors 4½:1 hydraulic reduction and reversing gear. The diesels were sold by Stewart & Stevenson Services, Inc., Houston.

GARDNER-Denver Company, Dallas, Texas, has bought from Waukesha Sales & Service, Inc., Houston, a model 195 DLCU Waukesha diesel, rated 76 hp at 2000 rpm, which will be utilized with one of the company's pumps.

GUY BROWN & J. P. Smith, Houston, have bought from Stewart & Stevenson Services, Inc., Houston, two General Motors diesels, each equipped with 1½:1 General Motors hydraulic reduction and reversing gear. The diesels, series 71, model 4087, are of the inclined type and will be used to power a pair of 30 ft steel crew boats.

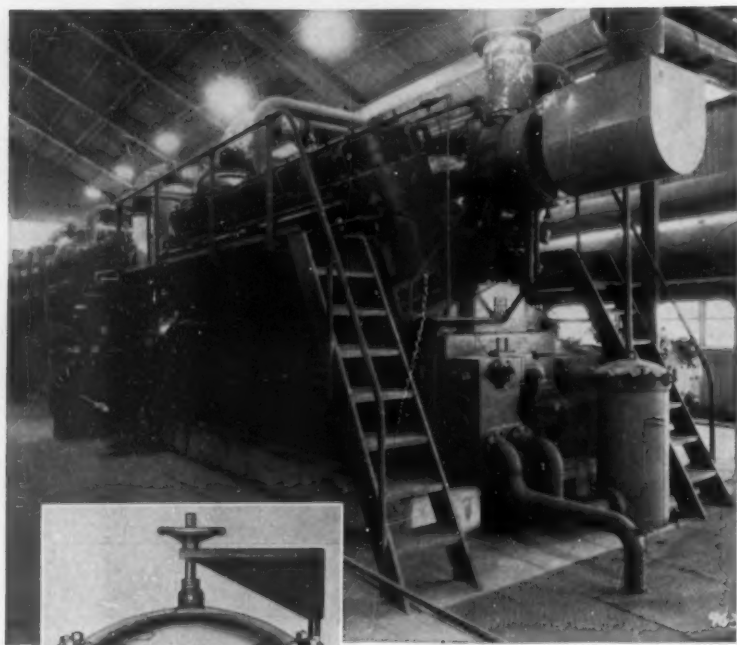
JEFFERSON Lake Sulphur Company, Brazoria, Texas, has secured from Stewart & Stevenson Services, Inc., Houston, a series 110, 6-cylinder model 62406 General Motors diesel which will be used to repower a 35-ton Plymouth locomotive.

BROWN & Root, Inc., Houston, have bought from Mustang Tractor & Equipment Company, Houston, a model D315 Caterpillar diesel, to drive a 40 kw ac 3-phase 60-cycle generator to furnish auxiliary power.

WILBUR Swanson, El Campo, Texas, has obtained from Stewart & Stevenson Services, Inc., of Houston, a series 71 model 6030C 6-cylinder General Motors diesel, rated at 150 hp which is equipped for dual fuel operation and which will power a turbine pump.

NATIONAL Supply Company, Houston, has bought for export from Big 3 Welding Equipment Company, Houston, a 300 amp Lincoln arc welding generator, powered by a series 71, model 2055 General Motors diesel.

After Two Years' Service — Clean as a Whistle Inside with NUGENT *Full-Flow* FILTERS



Nugent 1535 "Extended Area" Filter of the type used by El Paso at Midkiff. These filters are equipped with laminated crenulated fiber disc recharges which have had an average life of 2500 engine hours at the Midkiff Station. They remove solid particles as small as 2 microns but do not remove additives in detergent oils. Recharging requires only ten minutes.

Nine Ingersoll-Rand turbo-charged gas engine driven compressors at the Midkiff Station of El Paso Natural Gas Co. have been equipped with Nugent Filters since installation. The full-flow filtering provided by these filters has protected the bearings and kept these engine-compressors clean inside for well over two years. Service like this has resulted in many repeat orders from El Paso Natural Gas Co. and other leading pipe line companies.

To give your engines and compressors the protection they deserve, specify Nugent *Full-Flow* Filtering. This means that *all* the oil in circulation passes through the filter every cycle before going to the bearings . . . and it means that particles as small as a few microns are removed before they can damage precision parts. Write for helpful descriptive literature, today.



Wm. W. Nugent & Co., Inc.
3441 Cleveland St. Skokie, Illinois

OIL FILTERS, OILING AND FILTERING SYSTEMS, TELESCOPIC OILERS,
OILING DEVICES, SIGHT FEED VALVES, FLOW INDICATORS
Representatives in Boston • Cincinnati • Detroit • Houston • Los Angeles • Minneapolis • New Orleans • New York • Philadelphia • Portland, Ore. • San Francisco
Seattle • St. Louis • Tulsa • Representatives in Canada: Montreal • Toronto • Vancouver

Inland River Reports

By A. D. Burroughs

DESPITE the prolonged low water, plus the steel strike in 1956, the old year left with the record of one hundred billion ton-miles, for the first time on the 29,000 miles of inland waterways . . . and the new year began with many

sound reasons for believing that this same pace will continue through 1957.

ONE FACET of this faith is indicated in the continued placement of orders and continuation of shipbuilding with the big powerful twin-screw towboat now under construction at Dravo for Olin Mathieson Chemical Corporation. Similar to Valley Line's *A. D. Haynes II* and *Valley Transporter* this new 200-footer will be powered with Nordberg engines providing the 4200 hp, and put to work moving alumina to the new Olin plants in Ohio.

A PAIR of Superior engines, rated at 650 hp each, will power the new *Asa*, twin-screw towboat under construction at Byrant Boats, Inc. (Bayou LaBatre, Ala.) for A. P. Ward and Son, Inc. (Pensacola, Fla.). With completion date set for sometime February, this 65 x 22 x 9 ft towboat will feature the semi-bow, a single deck, and a rooftop pilothouse.

PILOTHOUSE location hits the news, too, with the new *Larry Turner*. Built and designed for Hutchinson Barge Lines, St. Louis by St. Louis Shipbuilding and Steel Company, the 1800 hp boat powered by General Motors engines, boasts the first river towboat with a three-position pilothouse, giving a pilothouse lift of 16 ft.

ANOTHER new towboat busy at work is the *Vienna*, recently delivered from Barbour Metal Boat Works (Lemay, Mo.), to Kanawha Sand Co., Parkersburg, W. Va. A twin-screw vessel, measuring 53 x 18 ft, it features the 450 hp from GM 6-110's (Detroit) plus Fairbanks-Morse generator and hydraulic steering.

FROM Nashville's West Tennessee Limestone Co., Inc., came the word of an order placement for a new vessel, 78 x 24 ft. Power will be provided by two Enterprise engines, 230 hp each. One engine will come from the firm's single-screw towboat *John Luchow*, the other will be a new one from Enterprise Engine and Machinery Company.

THE *John Luchow*, also owned by West Tennessee Limestone, is being rebuilt, repowered with a new 500 hp Caterpillar 397 engine, and renamed to *Frances H*, with work now in process at Nashville Bridge Co.

NASHVILLE Bridge is also rebuilding the burned *Elmore Foster* for West Tennessee Limestone, with power to be provided by new 1050 hp DMG Enterprise engines.

A CLOSE cousin to the *Andrew P. Calhoun* is now being built for stock supply

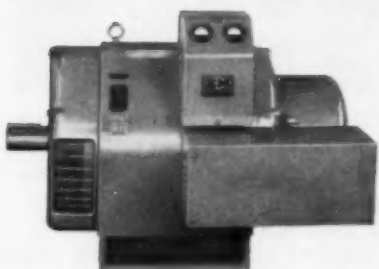
at Jeffersonville Boat and Machine Co. Measuring 160 x 35 x 12 ft this twin-screw towboat will be powered by a pair of GM engines, rated at 1600 hp each.

OTHER Louisiana news includes the powering of the 48-ft *Trinity*, built by Sewart Seacraft, Inc., with GM Turbo-power Detroit engines. This is one of

the first vessels of this size with this type of powering, it is reported.

THE MISSOURI Dry Dock and Repair Company, Cape Girardeau, Mo., is building a towboat similar to the much-heralded *E. E. Smith*, a '56 fall production. The new towboat will sport a hull 152 x 34 ft, with 1800 hp from a twin pair of GM Model 12-567 engines.

Get the latest! A COMPLETELY NEW "PACKAGED" GENERATOR AMP-PAK



AMP-PAK Generator shown is rated at 187 kva, 1200 rpm, 240/480 volts. AMP-PAK is available in ratings of 75 thru 187 kva at 1800 rpm and 62½ thru 187 kva at 1200 rpm. Three phase, 80% PF, 60 cycles, 50C rise, and 120/208, 240 and 480 volts.

No exciter . . . No moving parts in the voltage regulator

AMP-PAK is a compact, revolving field a-c generator with built-in, static excitation system; static voltage regulator; and basic metering and controls conveniently grouped. AMP-PAK is a portable unit, factory assembled, internally connected, and tested.

No rotating exciter to maintain. D-C excitation is provided by a heavy duty, long-life, static rectifier.

No tubes, relays, vibrators to service. Voltage is regulated by a static, E-M-developed sensing circuit and "magical" magnetic amplifiers.

Holds voltage "rock-steady" so your motors, lights, and electronic equipment will work better. The static regulator provides ±2% regulation.

Starts big motors. A special, built-in voltage booster transformer stands by to reinforce line voltage when heavy loads are suddenly applied.

Easy to install. Needs no switchboard. Just connect load to AMP-PAK thru a suitable line switch.

Simple to operate. Has no belts, no "tricky" commutator, no adjustments—anyone can operate AMP-PAK.

See your nearest E-M Sales Engineer and write the factory for publication PRD-236.



ELECTRIC MACHINERY MFG. COMPANY
Minneapolis 13, Minnesota

Largest manufacturer of "Packaged" Generators

2100-TPA-2154

FEBRUARY 1957

for long wearing fluid lines

STRATOFLEX

HOSE and FITTINGS

IGNORE VIBRATION and FLEXING

For trouble-free fuel, air, oil and hydraulic systems, depend on Stratoflex flexible hose and reusable fittings. Stratoflex hose and fittings are designed for diesel, automotive and general industrial applications where vibration, flexing, corrosion and abrasion are problems. A wide range of sizes and types assures you of exactly the right hose and fittings for your specific requirements. Stratoflex leak-proof reusable fittings simplify maintenance by making possible quick, easy replacement or modification. You solve both design and maintenance problems when you specify Stratoflex.

TYPICAL ASSEMBLIES

SF 225 SINGLE WIRE BRAID HOSE with SF 323, 324 REUSABLE SWIVEL FITTING for fuel, air, oil, water, hydraulic, LP-Gas, anti-freeze and other fluid lines where superior resistance to abrasion and corrosion is required.

SF 305 STAINLESS STEEL WIRE BRAID HOSE with ALL BRASS SF 323 REUSABLE SWIVEL FITTING for medium pressure applications where extra resistance to corrosion is required. Especially suited for marine uses such as offshore drilling rigs.

SF 313 DOUBLE WIRE BRAID HOSE with SF 320 REUSABLE SWIVEL FITTING for high pressure applications. Working pressure ranges 1,125 to 5,000 psi.

CALL YOUR
INDUSTRIAL SUPPLY
STORE OR WRITE FOR
COMPLETE CATALOG

STRATOFLEX

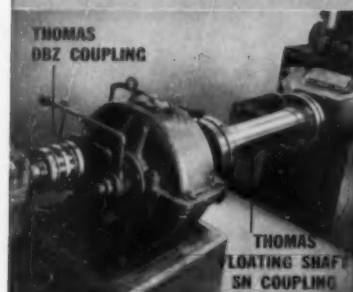
Inc.

P. O. Box 10398 • Fort Worth, Texas
Branch Plants: Los Angeles and Toronto
In Canada: Stratoflex of Canada, Inc.

Sales Offices:

- Atlanta
- Chicago, Dayton
- Houston
- Kansas City
- Los Angeles
- San Francisco
- Seattle, Toronto
- Tulsa

Freedom From Coupling Maintenance



Install Thomas Flexible Couplings

First cost is only cost when you buy Thomas Flexible Couplings... because Thomas Flexible Couplings are correctly engineered... have no wearing parts... need no lubrication... eliminate future maintenance costs. Even more, Thomas all-metal couplings are open for inspection while running—ending inspection shut-downs!

For all practical purposes, properly installed and operated within rated conditions, Thomas Flexible Couplings will last forever.

NO LUBRICATION... NO MAINTENANCE...

There Are No Wearing Parts

Under load and misalignment, only Thomas Flexible Couplings offer all these advantages:

1. Freedom from backlash—torsional rigidity
2. Free end float
3. Smooth, continuous drive with constant rotational velocity
4. Visual inspection while operating
5. Original balance for life

Write for Engineering Catalog 51A



Appointed to New DeLaval Post



Frank E. Lawatsch

Frank E. Lawatsch has been named Manager of the Marine and Oil Processing Division of The De Laval Separator Company. Mr. Lawatsch joined De Laval in 1946 as a research and development engineer. In 1951 he was transferred to the Company's Sales Department as Sales Engineering Coordinator, concentrating on special industrial applications. Mr. Lawatsch is a graduate of Colgate University. He is also a member of the American Chemical Society, the American Oil Chemists' Society and the American Society for Testing Materials.

Northern Calif. AGC Meeting

By F. Hal Higgins

The Northern California Chapter of the Associated General Contractors met in San Francisco in their 38th annual meeting November 30th last. While it was a business meeting with little oratory by those men who move mountains and water deserts all over the world to meet the demands of populations for more and better transportation arteries and adequate water supplies, they did have a few words for the public via the press.

First, 1957 is going to be a bigger year in heavy construction, regardless of whether home and business building go back. The U.S. road program is just tuning up and starting to roll. These are the men in this oldest AGC chapter—and the biggest chapter, too, they claim—whose companies are making dramatic construction history over the world. The writer noted all of the famous Big Six who built the Hoover Dam to start them on their way to the heights over the past quarter century were represented. Kaiser, Utah Construction Co., Bechtel, Morrison & Knudsen, and others were represented in the roll call of some 300 members, 150 being present.

Dr. George Cline Smith, vice-president and economist of F. W. Dodge Corporation, gave the AGC his forecast on 1957. "Construction as a whole will set new records in 1957," said Dr. Smith. "But the big push will come from new facilities in the heavy construction category. Ever since the end of World War II we have seen how the Construction Industry has been constantly changing its product mix to meet public demand and incidentally to keep total construction rising regularly. Next year we expect some slowing in the current terrific pace of business building, offset by some slight improvement in housing and by a very sharp increase in government investment, especially for highways. Considering that construction is by far the nation's largest fabricating industry, accounting for about 11% of our total output, its flexibility in meeting changing demands has been nothing short of remarkable. Because the industry looms so large, its prosperity is closely tied to the well being of business in general, both as to cause and effect. The business outlook for next year appears excellent. In our annual Dodge

survey of economists' opinion just completed, we found a remarkable agreement on this. The 221 leading business and university economists were generally agreed that all the main indicators would be above this year."

To sample the dieselizing of these big contractors who are winning the bids and getting the top jobs of road and dam construction, *DIESEL PROGRESS* Western Field Editor asked a few men present what they now own and operate in diesel equipment. Paul Nations of Morrison-Knudsen Company, Inc., whose jobs he had seen late this summer in two or three places, furnished this data: "We own some 4,400 pieces of major equipment from airplanes to Monaghan draglines and welding machines, totally valued at \$35,000,000. Among them—299 tractors from D-6's to D-9's, 170 prime mover scrapers, 42 diesel generators, 62 diesel motor graders, 98 diesel excavators, 8 diesel drills, 68 compressors from 315 cfm to 900 cfm, 187 Euclid trucks."

Charles E. McCammon of McCammon-Wunderlich Company said, "We are quite satisfied with the service given by both dealers and manufacturers of our diesel equipment."

Labor has been and still is one of the big problems of the heavy construction industry, Felix H. Siri, chairman of the Labor Committee reported. Four different unions had to be dealt with, and the carpenters and pile drivers struck for shorter hours and wage agreements, which were finally made. Naturally, good management and continual re-tooling by buying cost-cutting equipment is the combination being used by all successful contractors to win their bids and complete their jobs profitably. The diesel is the natural power for such cost-cutting tools and every contractor is using more and bigger ones.



AGC officials from left to right: Treasurer John Melphia, Vice President Milt Simpson, President Felix H. Siri, Secretary-Manager Frank W. Callahan.

Engines For Sewage Plant

Dedicated on November 8, 1956, the new municipal sewage treatment plant at San Jose, California, began service on November 12, with three Enterprise Model DGSG-8 625 hp engines providing electric generating power for pumps, blowers, lights, compressors, meters and other equipment. In remarks at the dedication ceremonies, San Jose's Mayor Robert C. Doerr noted frankly: "San Jose has needed a sewage treatment plant for

many years. The dumping of raw sewage into San Francisco Bay has been a black mark upon our community. Since passage of the treatment plant bond issues six years ago, city officials have worked aggressively toward its construction. Little did we know the many obstacles we would have to overcome before we could see our dream become a reality in this multi-million dollar structure."



Pictured at dedication of San Jose, California, municipal sewage treatment plant on November 8, 1956, are (from left): Robert C. Doerr, Mayor of San Jose; Henry Bahr, Service Manager, Enterprise Engine & Machinery Co.; Harold J. Flannery, City Engineer of San Jose.

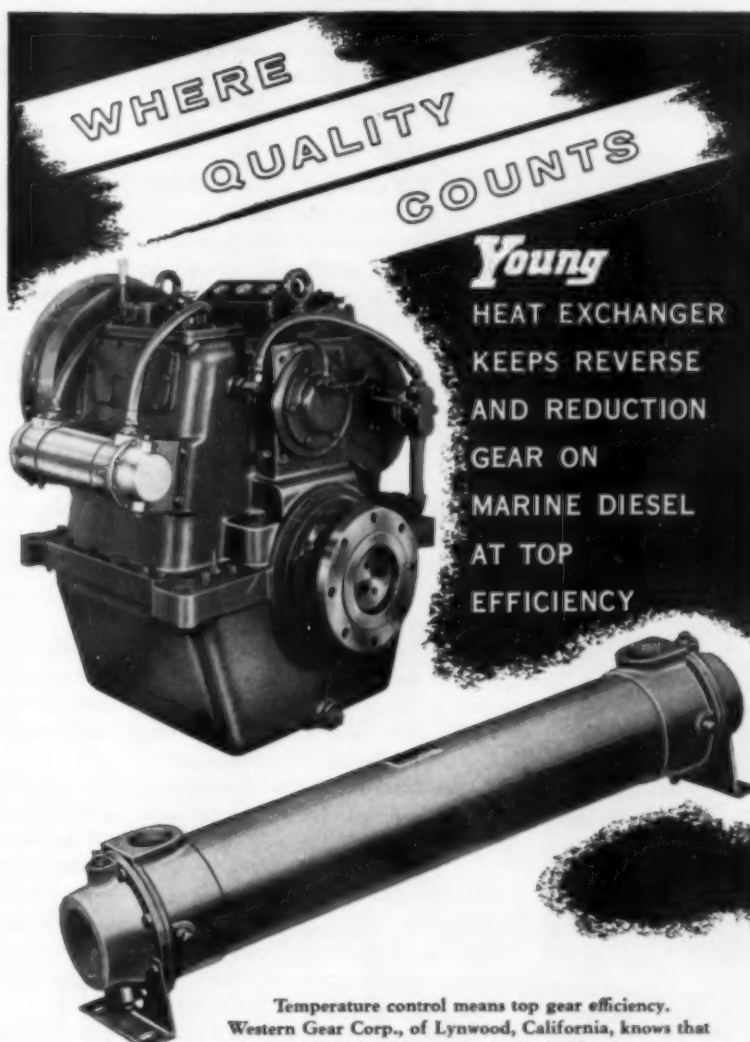
The plant has a design capacity of 54 mgd, delivered through a 5 ft diameter outfall sewer. In peak operation, about 1,000 hp will be required to operate all the plant equipment and it is estimated that 90% of the engine fuel will be supplied as gas recovered from the sludge digestion process. San Jose's \$3,445,000 plant has been under consideration since 1945, when bonds were voted for storm sewer construction to isolate the city's sanitary system and make sewage treatment possible. Preliminary plant designs were commenced in 1949, and bonds were passed in 1950. After site acquisition difficulties, land was obtained and final plans were produced in 1954. Construction began in April 1955. Engineering consultants to the City of San Jose included Hyde & Sullivan, and Brown & Caldwell. Walsh Construction Co. and E. V. Lane Corp. were joint venturers on the \$2,774,774 prime contract for construction.

General Manager



A. H. Schott

Mr. A. H. Schott has been appointed general manager of the Crankshaft and Camshaft Division of the Ohio Crankshaft Company it was announced recently by Mr. Foster H. Pettay, president. Since joining Ohio Crankshaft as supervisor of inspection in 1941, Mr. Schott has held a number of important positions as chief process engineer, master mechanic and factory manager. A member of the American Society of Tool Engineers, Mr. Schott attended Fenn College and Case Institute of Technology. He served as supervisor of inspection for the Hickok Electrical Instrument Company of Cleveland for two years before joining Ohio Crankshaft. Mr. Schott resides at 2777 Noble Road, Cleveland Heights.



Temperature control means top gear efficiency. Western Gear Corp., of Lynwood, California, knows that to keep their Sea-Master reverse and reduction gears for marine diesels at top efficiency the lubricating and hydraulic oil in these units must be cooled properly. W-G specifies Young Shell & Tube Heat Exchangers for this reason. On the Model 180 Sea-Master above a single pass Young unit is utilized. It provides ample cooling under adverse conditions. For cooling oil or water, for heating or cooling any liquid or gas, for either fresh or salt water applications Young Heat Exchangers are used where quality counts. They are economical in first cost and in operation. Young exchangers include factors for fouling and safety. They are easily inspected, cleaned, and maintained.

Write Dept. 407-B
for FREE Catalog



RADIATOR COMPANY

RACINE, WISCONSIN

Creative HEAT TRANSFER ENGINEERS FOR INDUSTRY
Heat Transfer Products for Automotive, Heating, Cooling, Air Conditioning Products
Aviation and Industrial Applications, for Home and Industry.

Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

Midwest Diesel News

By L. H. Houck

W. J. MENELEE Construction Co., excavation and grading contractor, on 11 miles of dual lane construction on U.S. 66, west of Lebanon, Mo., has put a newly invented, new type compaction machine to work. It is the Terrapac,

made by Vibro-plus Products Co., Inc., Stanhope, N.J. and sold by E. A. Martin Machinery Co., Springfield, Mo. The Terrapac has its own compaction power. Vibrations up to 1600 per minute are set up inside a conventional roller by a hydraulic pump powered by a Waukesha diesel mounted on the back of the machine. The diesel furnishes the impaction power while the roller is towed by a tractor.

STANDARD Carbon Co., Steubenville, O., has 8 International diesels driving Ready-Power generators, which provide the power for production of carbon brushes used primarily in electric motors. The plant load includes nine electric furnaces. The International diesel units include: three 100 hp PD-80's, a 125 hp UD-18A, a 45 hp UD-6A, a 190 hp UD-1091, a 62.5 hp PD-40 and a 24 hp U-2A.

BLICKHAN Const. Co., Quincy, Ill., have taken delivery on an International TD-9 with a Drott loader from Missouri-Illinois Tractor Co., St. Louis, Mo.

SALES OF diesel locomotives are still going up despite the widespread dieselization of the railroads. The Association of American Railroads reports 1221 new diesel-electric locomotive units installed by the industry in the first 10 months of 1956 as compared with 892 for the same period last year.

MARIONVILLE Special Road district, Marionville, Mo., have purchased a Model 45 Allis-Chalmers motor grader, powered with the new A-C diesel, from Chiles Tractor & Machinery Co., Springfield, Mo.

VAN KEPPEL Const. Equipment Co., Kansas City, has delivered a Chicago Pneumatic, Power-Vane-600 air compressor to Menefee Construction Co., of Sedalia, Mo., for use on a rock job on U.S. 66. It is powered with a 6-71 2-cycle GMC diesel.

TWO NEW Case 520 diesel tractors with pneumatic tires are being used on the U.S. 66 11-mile construction job of Menefee Construction Co. They are used for towing sheepsfoot rollers and other compaction equipment.

CHILES TRACTOR & Machinery Co., has delivered two Allis-Chalmers HD-6-G's to Bill McDonald at Branson, Mo., for general work.

ARTIE BRINLY, DeSoto, Mo., has taken delivery on an International TD-6 with Drott high lift from Missouri-Illinois Tractor Co., St. Louis, Mo.

RISS, of Kansas City, owner of one of the largest fleets of diesel over-the-road

tractors, all 6-71 GMC, keeps U.S. 66 sprinkled with its equipment.

TRANSCON Freight Lines, Oklahoma City, which operates a large fleet of tractor-trailer combinations, makes an impressive showing on the highways with its White diesel Freightliners. Engines are Cummins.

ADOLPH RIENER, Cecil, Wisconsin, has powered a 255-A P&H shovel with a 110 hp HRCIP-400 Cummins diesel which was delivered by Cummins Diesel of Wisconsin, Inc., Milwaukee.

C. E. PARKER Excavating Co., Granite City, Ill., has taken delivery on an International TD-9 with Drott high lift and a Wainrog backhoe to be used with the tractor for ditching work.

FARM Contractor, Ray Goodwin, West Plains, Mo., has gone in for heavier equipment with the delivery of an Allis-Chalmers HD11 with loader from Chiles, Springfield, Mo. Unit has the new A-C diesel, formerly Buda.

CHILES, Springfield, has delivered an Allis-Chalmers HD-6 to O. T. Mapes, Joplin, Mo., for custom work. He already has an Allis-Chalmers HD-15.

REPOWERING of a 6x6 Reo army surplus truck has been accomplished with 165 hp Model HRB-600 Cummins diesel by Baumgardt Construction Co., Dodgeville, Wisconsin.

C. A. BLINE, contractor of Rolla, Mo., has added an International TD-9 and Drott loader to his equipment from Mo.-Ill. Tractor Co., of St. Louis, Mo.

CITY OF St. Louis has purchased an Oliver OC-12 from Koste Machinery Co., Inc., for use by the water department. This unit has a Hercules diesel.

MEADOW GOLD, national manufacturers and distributors of dairy products, is using several GMC diesels in its truck fleet assigned to St. Louis, Mo.

SEEN IN The St. Louis area—A Leeways Trucking Co., tractor with Mack diesel and a Bemac Transport Co., rig with a Mack diesel.

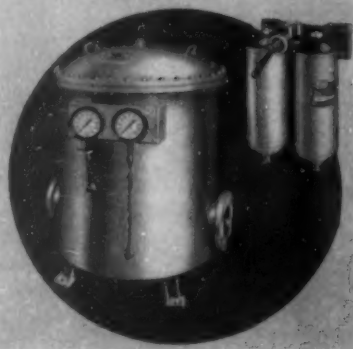
Publication Issued

The feature article in the latest issue of Production Road, "Every day is 'Selection' day in America" points out how there is an election going on in this country constantly—not just every few years. This election—call it selection, if you will—is of the goods and services that millions of Americans purchase and use daily. Production Road is a publication of the Twin Disc Clutch Company, Racine, Wisconsin. The magazine also includes articles and timely tips on the efficient application of these drives. For your copy of this interesting and colorful book, write the Editor, Production Road, Twin Disc Clutch Company, Racine, Wisconsin.

**PROVED
THROUGH
YEARS OF
USE...**

**Fulflo
FILTERS**

**Give maximum savings
by keeping both fuel
and lube clean**



Fulflo — the first full-flow lube filter ever applied to a high horsepower diesel engine — provides micro-fine clarification of both fuel and lube, for all types of stationary engines, mobile equipment, and for bulk filtration. Fulflo is applicable to both the pressure and suction sides of fuel lines. Fulflo gives you lower maintenance and operating costs — plus longer engine life by eliminating clogged nozzles and reducing engine wear.

Fulflo Filters have been perfected through the experience that comes only from pioneering. They employ genuine Honeycomb Filter Tubes for true depth filtration. Impurities are accumulated in hundreds of inner cells instead of building up quickly on the outside surface. Positively controlled densities give you any desired degree of micron clarity. Fulflo will not remove additives from oils.

Commercial Filters products include CFC (formerly Honan-Crane) Filters which employ a variety of filter media such as Cranite (Fuller's earth) for removal of soluble contaminants as well as abrasive particles. Inexpensive Michiana Filters, with "throw-away" or repackable elements, are also available.

Prolong engine life — reduce maintenance costs. Write to Dept. DS for technical literature.



Plants in Melrose, Massachusetts and Lebanon, Indiana



There is a size in the Kato line of generators with the electrical characteristics to meet your specific requirements. They hook up with any standard industrial diesel or gasoline engine by means of one of Kato's flexible couplings. All standard frequencies . . . 25-50-60 and 400 cycles plus many special frequencies to 1200 cycles (both fixed and variable). Now 400 cycles to 200 KW. 60 cycles to 500 KVA. One or two bearing designs. Extra lead wires brought out insure a maximum voltage selection.

**MOTOR GENERATOR
SETS**

Wide variety of both fixed and variable frequency ranges starting at 25 cycles, up to 1200 cps. 400 cycle line now up to 200 KW.

Builders of fine Electrical Machinery Since 1928

SPECIAL ORDERS WELCOME!

KATO Engineering Company WRITE TODAY FOR FOLDER IT'S NEW! PHONE 5831
1443 FIRST AVE. MANKATO, MINNESOTA

Northeast Diesel

Notes

By Arnold B. Newell

THE ALLEN St. pumping station at Dartmouth, Mass., recently purchased a Cummins 150 hp diesel Model HI-600 for pumping service. Cummins Diesels of New England, Inc., Allston, Mass. made the sale.

THE ORIGINAL butane engine in a Model A Tournapull belonging to J. R. Bazley of Pottsville, Pa., will be re-powered with a new Cummins 400 hp diesel, Model NVHBL-1200 sold recently by Cummins Diesel Engines, Inc. of Philadelphia.

SIX 100 kw General Motors generating sets have been sold to A. L. Dougherty, Inc. of New York City by the Griffin Equipment Corp., Bronx, N.Y. These sets will be used in one of the purchaser's overseas operations. The order included a Lakeshore master synchronizing panel.

A DIESEL driven underwriters approved fire pump installation is being made at Grasselli, N.J., by the William Stothoff Co. who purchased a General Motors Model 6061-A diesel to drive the pump from Griffin Equipment Corp. of the Bronx.

A 200 kw diesel driven generating set built by the Griffin Equipment Corp. of Bronx, N.Y., has been purchased by A. Neri, Inc. of New Jersey for use as standby electric power at the U.S. Rubber plant, Preakness, N.J. The set consists of General Motors twin 6-71 diesels and a Delco 200 kw generator.

TED WRIGHT, a fruit farmer of Gardiner, N.Y., had purchased an International Harvester TD9 dozer with Drott 4-in-1 loader and bucket for use in orchard extensions near New Platz. The Poughkeepsie branch of Edward Ehrbar sold the equipment.

THE SAME organization recently sold a pair of L 26 Lorain shovels, powered by GM 3-71 diesels to Stewart M. Muller of Croton-on-Hudson for use in general contracting work, especially public works in upper Westchester County, N.Y.

OLORIE CRANE Service of Haverstraw, N.Y., has just bought a Bucyrus-Erie Caterpillar powered Model 22 B back hoe and crane for general crane service. The vendor was Edward Ehrbar of Poughkeepsie.

A CATERPILLAR D6 dozer was sold recently by the Poughkeepsie branch

of H. O. Penn to Beckerle and Brown of Pearl River, N. Y., for general contracting near at hand.

THE ROXBURY Ski Center near Vega, N.Y., purchased an Allis-Chalmers HD11 dozer from Frantz Tractor & Equipment Company of New York City to work with an HD20 A-C dozer in the building of a 2000 ft ski slope with a 2000 ft run at a maximum angle of 56°. The dozers are also used for setting the T-bars and hauling and holding the 4000 ft of cable for attachment to the T-bars.

AT NYACK, N. Y. Calantuoni & Malone bought a new Caterpillar D77 with a 2½ yd front end loader for use in their earth moving work. H. O. Penn's Poughkeepsie branch made this sale.

TED MARET, a general contractor at Bloomingburg, N. Y., recently added a new Allis-Chalmers HD6-B to his fleet of mechanized equipment. The vendor was Frantz Tractor & Equipment Co. of New York City.

A CAT D4 with Hyster, winch and crane was sold recently by H. O. Penn to the Orange & Rockland County Electric Company for pole setting on right of way.

WHEN the Alsan Construction Company of Monticello, N.Y., started constructing the Washingtonville Central School they added an Allis-Chalmers C16-HD dozer to their list of equipment purchased from Frantz Tractor & Equipment Co.

ONE OF the two new fireboats for New York City which have been mentioned previously, on two occasions, in these notes will be powered with four 500 hp Enterprise diesels, two for propulsion and two for pumping. The propulsion engines will drive controllable pitch propellers. It would appear that the 4-engine method of powering has been accepted by the New York Fire Department as standard for future boats. Another boat will be built when an additional appropriation becomes available.

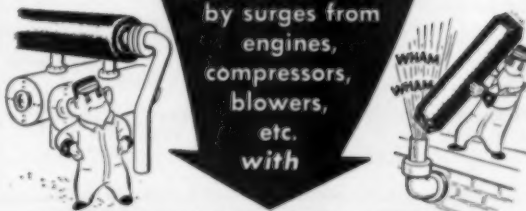
M. A. GAMMINO of Providence, R. I., purchased a Caterpillar D9 dozer for general contracting work in Conn. The H. O. Penn Machinery Company's Newington, Conn. branch made the sale.

THE ST. MARY'S Hospital in Waterbury, Conn., has purchased a 150 kw Caterpillar generating set for emergency service. This is the same model as another emergency set sold earlier to the Greenwich Hospital also by the Newington branch of H. O. Penn Machinery Co.

STOP

NOISE from air, steam
and gases discharged
to atmosphere

PULSATION in
pipelines created
by surges from
engines,
compressors,
blowers,
etc.
with



BURGESS-MANNING SNUBBERS

They are engineered to effectively correct your specific noise and pulsation problems. You will profit through better neighbor and employee relations and avoid compensation claims.

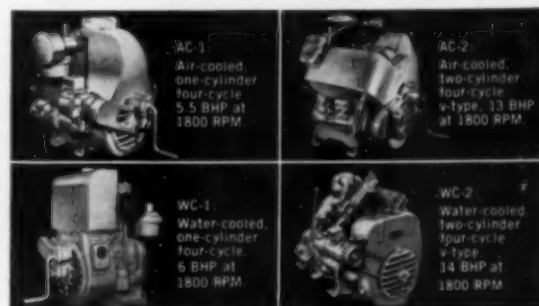
Write for full information.

BURGESS-MANNING COMPANY
Sound Engineering

747 East Park Avenue, Libertyville, Illinois
Dallas, Texas

THE BIG 4 IN DIESEL POWER

AMERICAN MARC and Hallett combine their resources to bring you the finest small Diesels made to fit every job. Write today for full details and specifications.



AMERICAN MARC also manufactures Diesel generating plants from 3 to 10 KW (AC or DC, and industrial three-phase), Diesel pumping units from 4 to 1700 GPM, marine propulsion, refrigeration units and power-packages for other services. American MARC can adapt any of its Big 4 engines to fit every job requiring from 5 to 20 BHP.

AMERICAN MARC INC. DIESEL ENGINES

1601 West Florence Ave.



Box 549, Inglewood, Calif.
Telephone OR 8-7174

AMERICA'S LARGEST MANUFACTURER OF AIR-COOLED DIESELS

Introduces Generator Set

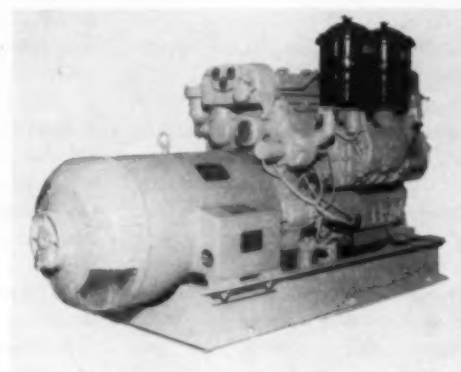
George Engine Co., Inc., has recently introduced another innovation—the Delco Safe-T Generator which is designed for use on hazardous locations to supply more nearly explosion-proof power. The increased safety of this generator is due to the fact that Delco has eliminated all spark-producing parts—commutators, slip rings and brushes. The very first Delco Safe-T Generator was exhibited recently in New Orleans by George Engine Co. during Oil Progress Week. At that time it was demonstrated that the Safe-T Generator employs a new concept of safety.

The conventional approach to the safety problem in power generators for drilling rigs has been to make these generators safer by relocating the generator excited and slip rings outside the machine proper and placing them in explosion proof hous-

ings. This has increased the size and price of the generators without producing the desired result. Delco's research and engineering has produced the Delco Safe-T Generator which eliminates the sparking or electric arcing components. In their stead is a new system of excitation which, when coupled with the proper regulation equipment, results in a machine with unusual flexibility and scope of application. In the Delco Safe-T Generator, the conventional dc exciter with its commutator is replaced with an ac exciter. The output of the rotating ac armature is rectified by silicon rectifiers mounted on the rotating assembly; the resulting dc current is supplied to the rotating field of the alternator.

Since the exciter armature, rectifiers and rotating field form a single rotating unit, interconnected by solid conductors, all arcing contacts are eliminated. This basic principle has long been recog-

nized by Delco, but was impractical due to lack of acceptable rectifiers. With the advent of present design and construction of silicon rectifiers these disadvantages have been overcome. The Delco Safe-T Generator is built to American Bureau of Shipping Standards, 100 kw, 125 kvs, continuous duty, 1800 rpm, 3 phase, 60 cycle, 208/416-240/480 volts driven by a GM series 71, six cylinder diesel engine. These generators are also available in 1200 rpm speed and in both 100 and 150 kw capacities.



George Engine holds the exclusive franchise in the Louisiana Gulf Coast area for GM marine, industrial and petroleum diesel engines. It is appropriate that they should be first to introduce this new Delco Safe-T Generator, since they are located in the heart of the offshore oil producing area.

ITS NEW

COLUMBIA GENERATORS

Standard Two Bearing Or With Engine Flywheel Housing Adaptors

A.C. GENERATORS
6 1/4 thru 875 KVA
1800 to 360 RPM

D.C. GENERATORS
2 thru 300 KW
1750 to 500 RPM

Write for Descriptive Bulletins

COLUMBIA ELECTRIC MFG. CO. 4557 HAMILTON AVE.
CLEVELAND 14, OHIO

A Channelcromed Diesel Engine Liner

★ An engine manufacturer, familiar with all types and brands of chromium, wrote: "We are all pleased at the new low in the rate of wear as with Channelcromium."

★ A railroad informs us: "Channelcromium on the bores of the liners of EMD 567 locomotive engines has established a new, all time low for the rate of lubricating oil consumption."

★ An engine manufacturer writes: "We have nothing but the highest praise for Channelcromium."



A Channelcromed EMD 567 diesel engine liner.

GO FIRST CLASS—with CHANNELCROMIUM. Ask for Bulletin 74.

PENNINGTON CHANNELCROMIUM COMPANY

319 Dakota Street

San Antonio 3, Texas

Sales Appointments



R. A. Harmon



Paul J. Demet

N. F. Adamson, Vice President—Sales, of the Twin Disc Clutch Company, Racine, Wisconsin, has announced two appointments in the General Sales Department. R. A. Harmon has been appointed Manager—District Sales, moving up from District Sales Supervisor. Connected with sales engineering since joining Twin Disc more than eight years ago, Mr. Harmon has served as Field Representative, Eastern District Sales Engineer and as Manager—Dealer Sales. He is a graduate of Case Institute of Technology, in Cleveland.

Paul J. Demet has been appointed Dealer Sales Supervisor. His responsibilities include promoting product sales through authorized dealers; establishing dealers in the United States, Canada, Mexico and U. S. Possessions; training dealer personnel; warehouse stock scheduling; and processing of dealer orders. He was graduated from the University of Wisconsin as a mechanical engineer, and came to Twin Disc in 1940. He has worked as a design engineer at Racine, at the Hydraulic Division in Rockford, Ill., and at Twin Disc's Cleveland office.

Michigan-Ohio News

By J. W. Brown

WOLVERINE Tractor & Equipment Company of Grand Rapids and Detroit has delivered an HUD Hough payloaders with a Hercules DIX-6-272 diesel engine to the city of Troy, Mich.

MICHIGAN Sewer Construction Company has purchased two model 600 Ingersoll-Rand compressors from R. G. Moeller Company of Detroit. Utilizing GM 6-71 Detroit diesels, the compressors will be used in building an 18,000 ft tunnel for the city of Denver, Colo.

MICHIGAN Tractor & Machinery Company of Detroit has sold a model 12 Caterpillar Motor Grader to Blackford Brothers, of Flint, Michigan. The Cat diesel in the model 12 grader is rated at 115 hp, 1800 rpm, and will be broken in on sub-division roadwork.

CUMMINS Diesel Michigan, Inc. is delivering to Mr. Andrew Mikola Jr. of Swanton, Ohio his third JT-6-B Cummins diesel. Mr. Mikola is installing the Cummins diesel in an IH model 190 truck, which was formerly equipped with a gasoline engine.

CONSUMERS Sand & Gravel Co. of Kalamazoo, Mich., have a new model 62406 RD (6-110) GM Detroit diesel, which was delivered by Peninsular Diesel of Detroit. This unit will replace a 5-year old earlier model 6-110 GM diesel engine.

AN IH model 12 payloaders (a new piece of equipment in the International Harvester line) has been delivered to Mr. Steve Klochko, Detroit, by Wolverine Tractor & Equipment Company of Detroit and Grand Rapids. The model 12 IH payloaders has a 1 3/4 cu yd bucket and is driven by an International Harvester diesel engine.

AN Allis-Chalmers HD-6G front end loader powered by an A-C Buda diesel was recently sold to Mr. Ernest V. Pont of Allen Park, Michigan by Earle Equipment Co. of Detroit.

CUMMINS Diesel Michigan Inc., has installed a model HRBI-600 Cummins 180 hp diesel engine in a Northwest shovel for the Edward C. Levy Co. of Detroit. An interesting note here is that the older model Cummins diesel, which was replaced, was in operation for almost 20 years.

PENINSULAR Diesel of Detroit has sold to the Ingham County Rd. Commission in Mason, Michigan a new 200 kw GM diesel electric plant, to supply power for a new portable asphalt plant.

AN HD-11B crawler tractor powered by an A-C Buda diesel and equipped with a hydraulic angle blade bulldozer was recently purchased from Earle Equipment Company of Detroit by Mr. Bill Lang of Beaverton, Michigan.

MR. JAKE Van Kampen of Allen Park, Michigan, has chosen a JT-6-B Cummins diesel to replace a gasoline engine in a Diamond T Truck. The installation was done by Cummins Diesel Michigan, Inc.

A 1 YD model 60 Bay City backhoe powered by a 4-71 GM Detroit diesel has been sold to Central Excavating Co. of Detroit by the R. G. Moeller Company, Detroit.

AN International Harvester TD-18 crawler tractor (bulldozer) has been delivered to the Meade Brothers located in Springport, Michigan. The sale was made by Wolverine Tractor & Equipment of Grand Rapids and Detroit.

CUMMINS Diesel Michigan Inc. recently installed a JT-6-B Cummins diesel in a model F-9 Ford truck for Mr. Lauren E. Hopkins of Midland, Mich.

A MODEL 45 Bay City backhoe equipped with a 3/4 cu yd bucket and driven by a GM 3-71 diesel engine was purchased from the R. G. Moeller Company of Detroit by Redford Excavating Co., of Detroit.

FOR USE in heavy construction. Mr. Homer Shingledecker of Pontiac, Michigan is breaking in a new International Harvester TD-24 crawler tractor—equipped with cable bulldozer and winch. The unit was sold by Wolverine Tractor & Equipment Company of Detroit and Grand Rapids.

MR. SYLVAN Carter of Detroit has accepted delivery on a new Caterpillar D-8 crawler tractor. The Cat D-8 is powered by a D342 Caterpillar diesel engine and was sold by Michigan Tractor & Machinery Company of Detroit.

AN Allis-Chalmers HD-6G front end loader with a tracto-motive ripper attachment and A-C Buda diesel was sold to Crest Contracting Co. of Detroit by the Earle Equipment Company of Detroit.

MASCOR Corp. of Farmington, Michigan, recently completed the heavy construction work of an 842-home housing project involving rough grading for 9 miles of road and a storm drainage reservoir 480 ft long and 12 ft deep. The equipment used consisted of one International TD-24 crawler tractor, one IH TD-14 tractor, two IH T-55 Pay-scrapers and one Euclid scraper.

DIESEL ENGINE CATALOG

The purpose of this little advertisement is to tell you about Volume 21 of **DIESEL ENGINE CATALOG** which is now available, entirely revised and rewritten. This is the 21st edition of the book that has earned the name of "the bible of the industry."

All smart diesel engine salesmen carry this book around in their car. When they run into some new competition with which they are not too familiar, the **DIESEL ENGINE CATALOG** gives them full, accurate information when they need it most.

The consulting engineer keeps this book in his reference file. It immediately gives him *all* data on diesel engines coming within a given horsepower range, speed range and weight range.

People who sell, people who buy, people who use diesel engines need this new, fully illustrated, up-to-the-minute volume. It has been completely revised and expanded. Orders are now being accepted for this latest edition. Price \$10.00 prepaid.

Add California Sales Tax for Delivery in That State

DIESEL PROGRESS

816 NO. LA CIENEGA

LOS ANGELES 46, CALIFORNIA

met the

PETTER DIESEL

family yet?



In the rugged **PETTER** diesel family are aircooled and water-cooled models all the way from 1 1/2 hp (the toughest baby yet) to 48 hp. And long, faithful service is an old Petter family tradition; witness the more than 400,000 Petters in use throughout the world.

The Petter motto is "ubique" (we get around). You'll find Petters driving well pumps in the Persian Gulf, irrigation systems in India, marine auxiliaries in Louisiana, standby generators in Connecticut. There isn't a piece of powered equipment in its range for which a Petter can't do a better, dieselized job . . . cut running costs and fire risk.

For rugged power in junior sizes, check the Petter range today! Write for information—a few choice dealerships are still open.

PETTER DIESEL ENGINES



Division of **BRUSH ABOE INC.**
60-07 39th Ave., Woodside, L. I., N. Y.
Branch office: 3307 Stillman St., Jacksonville 7, Fla.

MODERN SLOW SPEED

DIESEL ELECTRIC GENERATOR SETS

- **600 RPM—Worthington BB5**
100kw 3/60/480
- **300 RPM—Fairbanks Morse 33E16**
1125kw 3/60/480

Complete With All Auxiliaries
Other Sets From 20kw to 1200kw

DIESEL DIVISION
National Metal & Steel Corp.
TERMINAL ISLAND (Los Angeles Harbor), CALIF.
PHONE: NEVADA 6-9871



AVAILABLE Diesel Men Who Drive Themselves!

If you need one or more trained Diesel mechanics, our Placement Service can send you the energetic kind that every employer dreams about—fellows who drive themselves... These are men who have proved they have the inner drive by investing hundreds of hours and hundreds of dollars of their own money for Diesel training, and are now eager to go to work at any Diesel job, anywhere you say. Just tell us your requirements, and we will endeavor to supply the men to meet them.



**UTILITIES ENGINEERING
INSTITUTE**
2523 NORTH SHEFFIELD AVENUE
CHICAGO 14, ILLINOIS

For fast action, 'phone us at EAstgate 7-7117

F.M.	AGSCO	SUPERIOR
C.P.	ANNOUNCES ITS	ATLAS
C.B.	SERVICE PARTS DIVISION	UNION
ALCO	A. G. Schoonmaker Co., Inc.	WASH.
B.L.H.	NEW	G.M.
WORTHING-	DIESEL ENGINE PARTS	E.M.D.
TON	FROM CRANKSHAFTS TO HEADS	C.D.E.D.
I.R.	FOR ALL MAKES AND MODELS	D.D.D.
ENTERPRISE	30% to 50% SAVINGS	
NORDBERG	TRY OUR SERVICE	
	WRITE-WIRE-CALL	
	(S.P.D.)	
	"SAVE PARTS DOLLARS"	

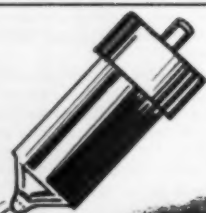
A. G. Schoonmaker Co., Inc.

Sausalito, Calif. 50 Church St., N.Y.
Sausalito 1600 Digby 9-4350
Nites: San Rafael, Calif. Nites: Oakland, N. J.
Glenwood 3-3230 Oakland 8-7813

Adeco makes
more than

300

different Diesel
fuel injection



WHETHER

you use

"C" or "D" fuel

injection

we have the

right equipment

built by

leading craftsmen

to give

you hours of

trouble-free

service. Always

ask for Adeco.



ADVERTISERS' INDEX

Adeco Products, Inc.	64	Interstate Diesel Service, Inc.	64
Alco Products, Inc.	14	Kato Engineering Co.	60
Allis-Chalmers Mfg. Co. Buda Division	6-7	Lane Plating Works	64
American MARC, Inc. Hallett Diesel Engine Div.	61	Maxim Silencer Co., The	47
Brush Aboe, Inc., Petter Engine Div.	63	National Metal & Steel Corp.	64
Buda Division, Allis-Chalmers Mfg. Co.	6-7	Nugent & Co., Inc., Wm. W.	56
Burgess-Manning Company	61	Pennington Channelcromium Company	62
C. A. V. Ltd.	45	Purolator Products, Inc.	4
Columbia Electric Mfg. Co.	62	Ross Heat Exchanger Division of American-Standard	8
Commercial Filters Corp.	60	Schoonmaker Co., Inc., A. G.	64
Cooper-Bessemer Corp.	Fourth Cover	Scintilla Division, Bendix Aviation Corp.	11
Dupont de Nemours, E. I., & Co. (Inc.) ...	55	Sebastian Diesel Equipment Co.	64
Eaton Manufacturing Co.	49	Standard Oil Co. of California	9
Electric Machinery Mfg. Co.	57	Standard Oil Co. (Indiana)	12
Erie Forge & Steel Corp.	10	Stratoflex, Inc.	57
Garrett Corporation, The (AiResearch Industrial Div.)	13	Texas Co., The	Second Cover-1
General Motors Corp. Harrison Radiator Div.	2	Thomas Flexible Coupling Co.	58
Harrison Radiator Division, General Motors Corp.	2	Twin Disc Clutch Co.	5
Houdaille Industries, Inc. Buffalo Hydraulic Division	54	Utilities Engineering Institute	64
		Waukesha Motor Company	53
		Winslow Engineering & Manufacturing Co. ...	52
		Wix Corporation	51
		Young Radiator Co.	59

Diesel Engines with Generators, or without

Fairbanks-Morse 80 to 1000 HP, DeLavernge 1000 HP, Enterprise 1100 to 1600 HP, Alco 1000 HP, National Superior 960 HP Dual Fuel. Many Others 10 HP and Up. Parts for all diesels: Pistons, Heads, Cylinders, Crankshafts, Nozzles, Pumps, Motors, Flywheel, Cooling Towers, Etc.

Low Prices. Phone, Wire or Write.

Sebastian Diesel Equipment Company
Joplin, Missouri Phone MA. 3-3300

America's Largest GM fuel injector rebuilders

Interstate
diesel service incorporated

2093 East 19th Street • Cleveland 15, Ohio

Products sold exclusively through dealer and distributor organizations throughout the United States and Canada. Dealer inquiries welcome

Grinding and Hard-Chrome Plating of Diesel Engine Crankshafts



ALL SIZES

Complete facilities for grinding, plating, Magnaflexing, and electrically controlled heat-treating. Largest hard-chrome plating plant in the Mid-Continent area. Experience • Quality • Precision

**LANE
PLATING WORKS**
5322 BONNIE VIEW RD.
DALLAS, TEXAS

D
I
E
S
E
L

E
N
G
I
N
E

C
A
T
A
L
O
G

Vol

21

DIESEL ENGINE CATALOG

VOLUME TWENTY-ONE

1956-1957

NOW READY TO MAIL

All Orders Promptly Shipped

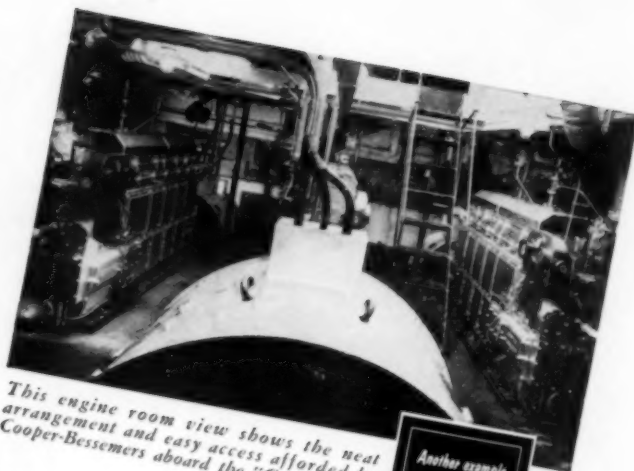
THIS NEW EDITION IS NOW AVAILABLE

A 400 page book, 10½ inches by 13¼ inches, bound in white board.
\$10.00 postpaid. (Plus California Sales Tax where applicable.)

This edition limited to 10,000 copies.

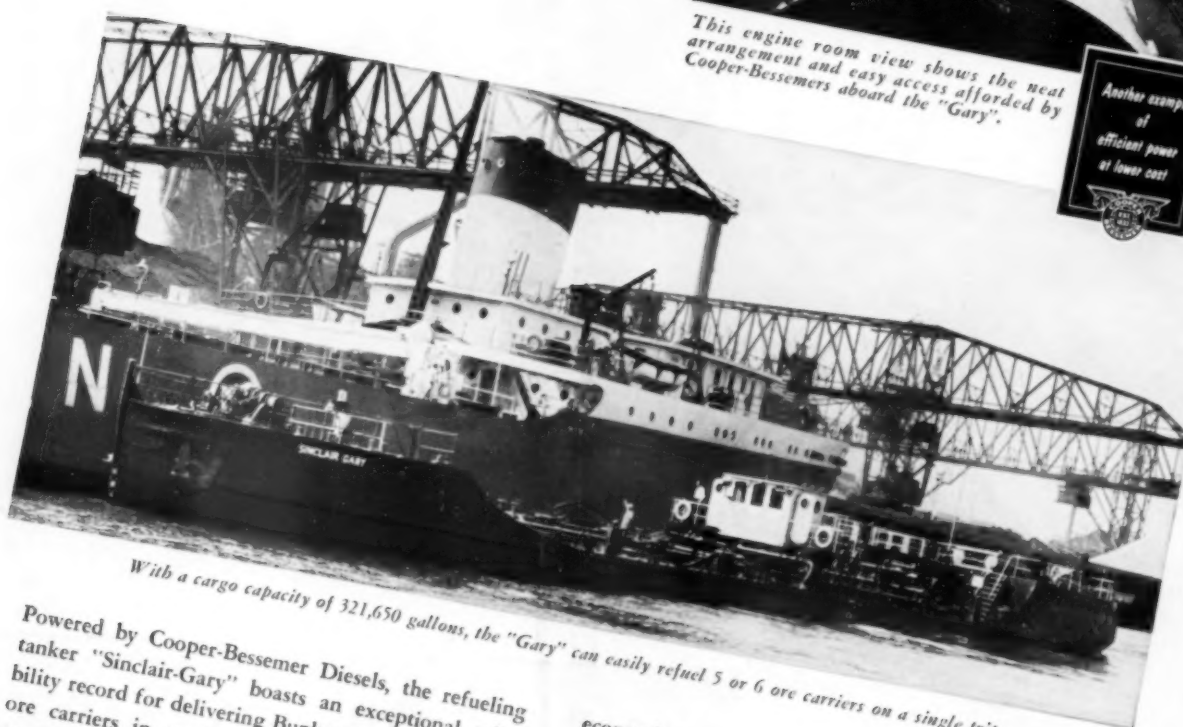
**Send Orders to DIESEL PROGRESS
816 No. La Cienega Blvd., Los Angeles 46, Calif.**

*Cooper-Bessemer's aboard
the "Sinclair-Gary"...*
**A 26-YEAR RECORD
of stamina.....
and availability!**



This engine room view shows the neat arrangement and easy access afforded by Cooper-Bessemer's aboard the "Gary".

*Another example
of
efficient power
at lower cost*



With a cargo capacity of 321,650 gallons, the "Gary" can easily refuel 5 or 6 ore carriers on a single trip.

Powered by Cooper-Bessemer Diesels, the refueling tanker "Sinclair-Gary" boasts an exceptional reliability record for delivering Bunker C fuel oil to giant ore carriers in southern Lake Michigan. Presently owned and operated by the Sinclair Refining Company, the "Gary" was originally launched back in 1930... and still not one day lost to shipyard repair.

The vessel's three Cooper-Bessemer engines, each rated 165 hp at 550 rpm, deliver the same efficient,

economical power today that they did 26 years ago. This ability to provide year-in, year-out dependability is typical of the Cooper-Bessemer record in marine service everywhere.

If your future plans include repowering, or power for a new vessel, make sure you have all the facts. Contact Cooper-Bessemer today for further information on marine engines ranging from 200 to 5000 horsepower.

ENGINES: GAS • DIESEL • GAS-DIESEL

COMPRESSORS: RECIPROCATING AND CENTRIFUGAL, ENGINE OR MOTOR DRIVEN



**cooper-
bessemer**

New York City • Seattle • Chicago • Houston • Washington • San Francisco • Los Angeles • St. Louis • Gloucester • New Orleans
MOUNT VERNON, OHIO • GROVE CITY, PENNA.